THE PRACTICAL TEACHER

With which is incorporated

THE PRACTICAL TEACHER'S ART MONTHLY

"It is to be noted that when any part of this paper appears dull, there is a design in it."—*Steele.*

Vol. XXXI. No. 10. APRIL, 1911. Price 6d.

Notices to Correspondents and Subscribers.

"The Practical Teacher" may be ordered of any Newsagent or Bookseller, or at any Bookstall, in the United Kingdom or in the Colonies. Supplies are sent monthly to the chief towns in Australasia, South Africa, and India.

London: 35 and 36 Paternoster Row.
Edinburgh: Parkside Works.
Dublin: 17 Talbot Street.
Leeds: 14 Albion Place.
New York: 381-385 Fourth Avenue (Corner 27th Street).
Paris: 61 Rue des Saints-Pères.
Leipzig: Königstrasse, 35-37.

Subscribers may obtain "The Practical Teacher," post free, from the Publishers at the following terms:—

United Kingdom, Continent, Colonies, and United States, } 12 Months, 8/- 6 Months, 4/-

All literary communications should be addressed to the Editor, Office of "The Practical Teacher," 35 and 36 Paternoster Row, London, E.C.

Remittances, Cheques, Post-Office Orders, etc., should be made payable to Thomas Nelson and Sons. Advertisement rates on application.

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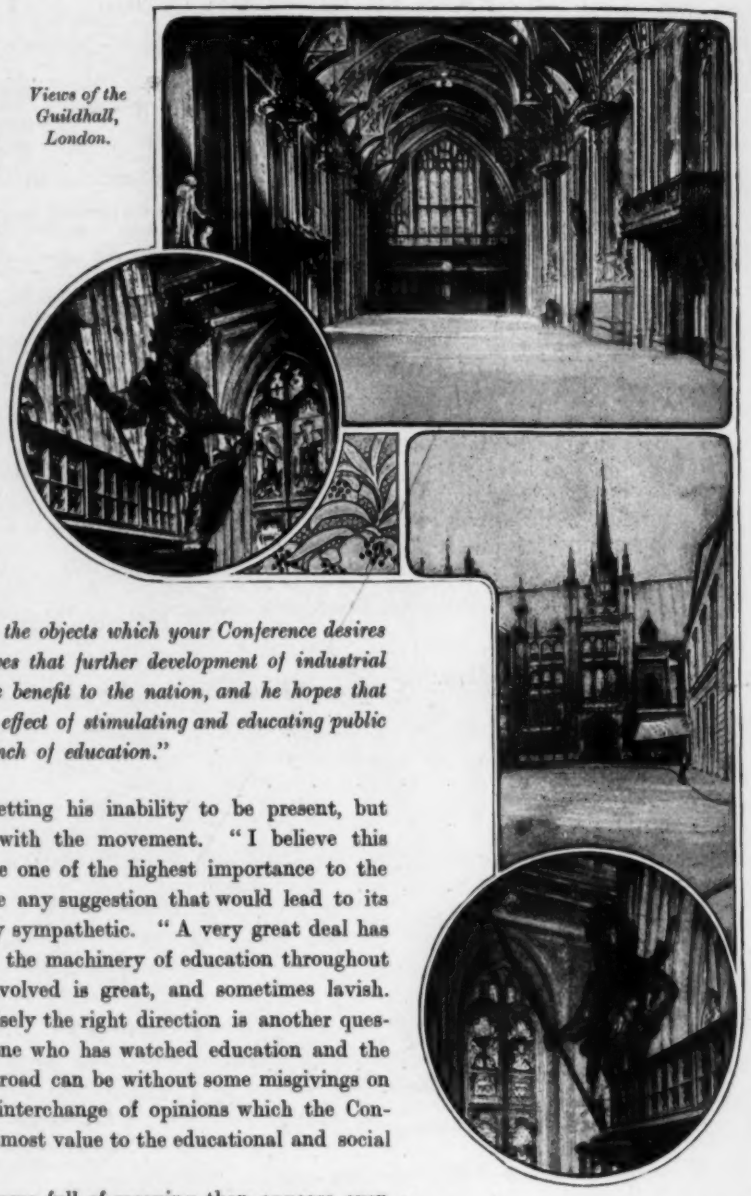
"A COMMITTEE OF WOLVES."

BY OUR SPECIAL REPRESENTATIVE.

"FOR the most part this Conference reminds me of a committee of wolves sitting to inquire into the scarcity of lambs." In these words Mrs. Bridges Adams of the Gasworkers' Union described the Conference on Industrial Training held in the Metropolitan Guildhall on the last day of February. It is well to have both sides of every question put forcibly before us; and this was the view of a prominent social worker on a movement which found expression in the formation of a National Industrial Education League as the result of the aforesaid Conference.



Views of the Guildhall, London.

The meeting was under the most distinguished patronage. The presence of the Lord Mayor gave the sanction of the City to a movement which voices the dissatisfaction of the general public with our elementary school system. King George sent his cordial wishes for the success of the Conference through Sir Arthur Bigge, who wrote to the Lord Mayor:—

> *"I am commanded by the King to convey to you the expression of his sympathy with the objects which your Conference desires to secure. His Majesty believes that further development of industrial training will be of inestimable benefit to the nation, and he hopes that your Conference will have the effect of stimulating and educating public opinion in favour of this branch of education."*

The Prime Minister wrote regretting his inability to be present, but expressed his practical sympathy with the movement. "I believe this question," Mr. Asquith said, "to be one of the highest importance to the national welfare, and I shall welcome any suggestion that would lead to its solution." Mr. Balfour was equally sympathetic. "A very great deal has been done," he wrote, "to organise the machinery of education throughout the country. The expenditure involved is great, and sometimes lavish. Whether we always direct it in precisely the right direction is another question, and I do not think that any one who has watched education and the industrial progress at home and abroad can be without some misgivings on the point. I am certain that the interchange of opinions which the Conference will produce will be of the utmost value to the educational and social welfare of the country."

These are weighty words, and more full of meaning than appears even on the surface. It is true that they do not carry us far in a practical direction, but they ought to be enough to warn teachers of all grades that great and far-reaching changes are impending which will affect every lesson of the day and every branch of school work.

The Lord Mayor's presidency of the meeting was of no perfunctory character, but the subject was given the

careful treatment which it undoubtedly deserves. He had himself ventured to place the matter before the King, and considered that the formation of a body like the National Industrial Education League would, in this Coronation year, prove to be "the placing of a crown of efficiency upon national elementary education in this country." (Truly Cinderella has come into her own in these days!) He thought the aim of the Conference to be "the deepening and strengthening of the foundation of national prosperity by imparting to the children a 'useful education.'" In his opinion, the training of the young had "occupied the best thoughts of the best men in all ages." (The meeting cheered this excellent pronouncement to the echo, unconscious of the humour of the situation.) And the representative character of the Conference, which was composed of delegates from all parts of the country, enabled his lordship to assert that the object of the gathering was nothing less important than "securing the emphatic declaration of the nation upon a supremely important question."

Let us give at this point, for the careful consideration of our readers, the two resolutions which were passed by the meeting, not without dissentients, it is true, but by overwhelming majorities:—

First Resolution—

"That this Conference views with grave concern the large number of children annually leaving school without practical training for definite vocations, and—

RESOLVES that a national system of industrial, professional, and commercial training should be established, to which the children shall pass as a matter of course (unless the parents are prepared to undertake their future training) and without interval, for a definite period, to be thoroughly trained for entry to the particular calling for which they are best fitted, such training to be under fully qualified instructors. That the Government be urged to provide by legislation such a complete system of training, free to all scholars, and the expenses thereof defrayed from the national exchequer."

Second Resolution—

"That the proposed National Industrial Education League be and is now established, and that the following list of names be the General Committee, with power to add to their number, and to appoint such other committees and officers and take all such steps as may be necessary for the purpose of carrying out the objects proposed by this Conference."

The first resolution did not pass unchallenged, as we have already indicated. Mrs. Bridges Adams seemed to see in the movement an attempt to revive, so to speak, the days of child chimney-sweeps, and roundly declared that she had never seen anything so absolutely vague and misleading as the resolution put before the meeting. What was wanted, she declared, was not that the child should have a trade, but that it should have a childhood. (We thought we saw a response to this particular appeal on the faces of Professor Sadler and Mr. Herbert Cox.) She poured scorn and more or less polite invective upon the aristocratic occupants of the platform who had sat in judgment upon the poor parent in his (or her) anxiety to add a few shillings to the weekly income by sending children to work. And she rounded up with the summary which stands at the head of this paper.

Sir Swire Smith levelled many criticisms of a less sweeping, but none the less damaging, character against the first resolution. "I do not think," he said, "that you can give practical training to children of eleven or twelve for definite vocations." And he went on to say that "whether boys are naturally fitted for a certain trade or not, they are forced into it by parents who care more for big wages than they do for skill or craftsmanship." His chief contention seemed to be that we have in existence plenty of means to attain the end desired, but that we do not take advantage of them. Quoting from Emerson, he said: "We must take the step from training to doing; we must teach the rising generation to do the things that the world wants done." And he ended with the practical suggestion that the best plan for all who took the matter seriously was to go to the Board of Education and ask them to substitute "shall" for "may."

[We did this ourselves on the appearance of the Board's recent circular on manual training. But the Paul Pry of Whitehall has got into a fatal habit of weakly "suggesting" and of hoping that "he does not intrude."—ED.]

The criticisms of this speaker, which were very able, suggestive, and good-tempered, were formally embodied in an amendment, suggesting that the Government be asked to give financial aid to enable education authorities to provide facilities for the practical industrial training of boys, and for the practical training of all girls in household work and domestic economy, and that all boys and girls after leaving the day school should be required during a portion of each year, until the age of eighteen, to attend evening continuation or technical schools.

Lord Brassey, in proposing the first resolution, had said: "I am the son of a self-made man, of one who

succeeded in a strenuous career. When my father was asked for advice as to how best to train up sons, his reply always was, 'Teach your boy a trade.'" Then with true instinct his lordship of the *Sunbeam* went to the root of the matter. "It may be," he said, "that the chief thing to be done is to encourage parents to resist the temptation to supplement their earnings by putting their boys to trades in which, without skill, considerable wages may be earned, but with the dire prospect of losing employment later on."

Professor M. E. Sadler, M.A.

On the point here raised Sir George Kekewich had something to say. He began by criticising the curriculum and the time-tables in the elementary schools, inasmuch as they were drawn up in order to satisfy literary inspectors. His practical suggestion on the economic matter raised by Lord Brassey, and dealt with so forcibly by Mrs. Adams, was to form a compulsory system of industrial training subject to the payment of a maintenance grant to parents.

As we have already indicated, Professor Sadler was present at the meeting. We hoped he would speak, but he left before the close. Two days later, however, there appeared in the *Morning Post* the following letter, which gives us clearly and authoritatively the conclusion of the whole matter:—

"At yesterday's Guildhall Conference on Industrial Training the meeting carried a resolution, to part of which grave exception may be taken.

"The resolution justly called attention to our present deficiencies (serious indeed, but, through the energetic action of the London and many other local authorities, not now so serious as some of the speakers seemed to think) in regard to continued industrial and civic education through the formative years of adolescence. But it went on to recommend 'that the Government be urged to provide by legislation such a complete system of training, free to all scholars, and the expenses thereof defrayed from the national exchequer.' Read in connection with the earlier part of the resolution, these words pledged the meeting to two propositions—namely, (1) that the central government should organise the whole of a system by which every young person would be trained for the particular calling for which he or she is 'best fitted;' and (2) that this system of universal 'industrial, professional, and commercial training' should be paid for out of imperial taxation, and be provided gratuitously for all comers.

"Now, if the central government is to organise this system of adolescent training with the completeness indicated by the resolution, it will be forced, by the logic of facts and by inevitable progression, first to decide, in the case of each individual, what calling he or she is best fitted for; and secondly, to regulate the number of those applicants who shall at any given time be admitted to preparation for any particular avocation or employment. I submit, however, that no central government, of the sort which is humanly probable, is so well qualified to decide the first question as are the young person's parents or the young person himself. To what calling would a fourteenth-century Board of Education have assigned that country-bred orphan boy Dick Whittington? Nor, secondly, would it be prudent to throw upon a government department the responsibility of deciding how many persons should be allowed to enter upon preparation for any particular calling (industrial, commercial, or professional) in any given year. What officials, however conscientiously painstaking, could decide which, among the hundred fine gradations in each great type of employment, is at any given moment to be forbidden to receive any new recruits, however gifted or industrious? To what forms of political pressure would not such a central department be exposed, both in the supposed interest of the national welfare and through the more concealed designs of self-interested monopoly? Shall we not fare better by a policy of greater industrial freedom, tempered by judicious educational guidance?

"The second proposition to which yesterday's meeting committed itself is that the whole system of technical, professional, and commercial training be paid for out of imperial taxation, and be provided free of cost for all candidates. If the whole of this type of education is made free at the cost of the taxes, there will either be waste through capricious use being made of expensive classes by unsuitable students, or the

State, as paymaster, will have to exercise over all forms of employment a degree of selective control for which its knowledge is inadequate.

"Shall we not do more wisely to develop and improve an elastic system which would combine self-help and freedom of individual choice with sufficient subsidy (1) from the central government; (2) from the local authorities; (3) from private benefactors, including the employers and trade unions and the great professional societies; and (4) from public-spirited bodies like the City Companies, which have given to technical instruction in England assistance and encouragement at once timely and munificent.

"Our civilisation depends upon trained capacity combined with purposeful character. The two are closely connected. The man who thoroughly knows a calling by which he can live has in his possession one of the corner-stones of an independent character. The man who has self-command and faith in an ideal has the moral qualities which favour perseverance in self-education. It is true that, within limits not yet reached by us, the organisation of society may be so regulated or designed as to promote the acquisition of technical attainment and to lessen the risk of moral failure. But the things essential to personal improvement and efficiency are industry, integrity, self-denial, and intelligence. These are individual qualities, and to compress them into atrophy by measures of over-restraint would be disastrous to national welfare."

STAMMERING AND OTHER DEFECTS OF SPEECH IN SCHOOL CHILDREN.

BY H. EMLYN JONES, M.R.C.S. (ENG.), L.R.C.P. (LOND.).

IT is probable that to many teachers stammering and defects of speech do not at first sight appeal as "common ailments." For some strange reason the condition is scarcely regarded, either by the parents or by the teaching profession, as being within the sphere of treatment by the medical officer—but few children being specially presented for such ailments to the inspectors at the routine medical examination. Yet I find about four per cent. of all school children (excluding the mentally defectives) suffering from some defect of articulation. Among the mentally deficient there are a very large proportion showing some such defect, often a simple slurring of word endings: for example, one child says "do" for "dog;" others substitute "d" for "th," saying "da" for "that," or entirely omit consonants. Among intelligent children the two chief faults are stammering and the substitution of "th" for "s," or the use of "w" in place of "n"—the two faults commonly known as lisping; but occasionally the omission and substitution of sounds is carried to such a degree that speech is unintelligible, though the child speaks with such fluency and obvious intelligence that it cannot possibly be classed as mentally deficient. That little is heard of it from the child is not to be wondered at, for the stammerer is not of the type which is always attempting to gain sympathy by directing attention to his symptoms; yet nevertheless it is very curious that so little concern is shown in these cases by the parents. The existence of the condition is, no doubt, noted, but is usually put down as a "slight impediment," the parents generally explaining the cause of the child's condition as a bad habit, and only applying such treatment as is implied in the expression, "He will grow out of it." The chief defects of articulation and their treatment present in school children may be classified as follows:—

1. *Defects of speech due to gross organic defects.*

Amongst the organic defects we have to deal with are those caused by cleft palate and hare lip. The upper lip may be fissured through imperfect development, or there may be more or less a decided fissure of the palate. In slight cases the uvula alone is fissured; in extreme cases the cleft extends through both the soft and hard palates as far forward as the lip, and is often combined with hare lip. Now, whatever surgical skill is brought to bear upon the healing of the fissure, or whatever comfort is afforded the sufferer by mechanical aids, such as artificial plates, etc., one great congenital fault remains—namely, a painfully defective articulation which, in some cases, renders the speech quite unintelligible. Defective articulation arising from cleft palate varies immensely in its character, and the degree of variation depends upon the greater or smaller extent to which the faulty organs are affected by it. The great trouble with which we have to contend in these, as well as in other defects of speech, is defective breathing; the air, instead of being forcibly expelled from the mouth cavity, travels about and finds an outlet through the nose cavity. In some cases the child cannot whistle or even puff out his cheeks. For such conditions proper gymnastics of the vocal organs, movements of the jaw and tongue, and diaphragmatic breathing are advised. Besides the benefit which these exercises are to the articulation by forcing the child to place his tongue, jaws, and lips in proper positions, they very often improve the appearance of the sufferer. Should the upper teeth be also defective, the upper jaw must then learn to do duty for the teeth, as, for example, in the production of the letters "t" and "s."

2. *Persistent infantile speech.*

As far as possible, all those having the care and training of children should have distinct speech, free from all gross faults of articulation, especially lisping. This is particularly necessary for those engaged in teaching infants. It is in the early years of life that speech is acquired, and it is in the early years of life that correct example and efficient training can do much to prevent the more common errors of speech. A very foolish practice, and one which is unfortunately far too prevalent, is that in which the child has an error of articulation, and the fond parent in speaking to the child, correctly imitates the child's fault, thinking that the child will thereby understand her the better, instead of which she is favouring the persistence of the defect.

For example, one frequently hears a parent say to a child "dood baby," and like expressions, until the child finally believes that the correct word is "dood." There is no harm in the conventional expressions of small children, such as "bye-bye" and the like, but the harm lies in allowing the child to articulate this baby talk wrongly.

3. *Nasal speech and defects of speech due to adenoids or nasal obstruction.*

The nasal twang so often found in people and children with perfect organs is the result of weak expulsion of air through the mouth cavity—in fact, a certain kind of affected or lazy speaking which can also be dealt with by forcible and proper breathing exercises. Nasal speaking is really lazy speaking, or, in other words, speaking without sufficient breath expulsion. Defects of articulation due to adenoids I have dealt with in a previous paper.*

4. *The speech of mentally defectives.*

The mentally defective child does not speak well, because it lacks the mental power to do so. There is no doubt that in many cases of feeble-mindedness proper articulation is out of the question, simply because there is no power of retention. The child forgets the sound, and therefore the teacher requires energy, power, patience, and perseverance to teach the most elementary sounds. Really such teachers should be trained in colleges for teachers of the deaf; for, like the latter, the one essential is that they must know how to teach articulation and language properly.

5. *Lalling and lisping.*

Lalling is a defect due to want of precision in the oral articulatory mechanism. It is a persistence of the characteristic speech of children before articulation is completely learnt, and frequently occurs in connection with deficient mental intelligence or among backward children. In this respect it differs from stammering, which practically always occurs in those who are fully up to, if not above, the normal intelligence.

Lisping is a defect resulting from the indistinct enunciation of certain consonants, or from the substitution of wrong consonants. It is also commonly met with in infants learning to speak, and may persist from a clumsiness in articulation. Frequently it is excited by loss of the first milk teeth, and then becomes a habit. The most common faults are the substitution of "th" for "s," and "w" for "r" at the beginning of words, so that the child says "thithter" for "sister," or "wound" for "round;" but omission of consonants both in the middle and at the end of words occurs, or even the substitution of sounds following no special rule. Occasionally this is carried to such an extent that many different sounds are all replaced by a similar one. Speech then becomes quite unintelligible, but is frequently spoken so fluently that it can be seen that the child understands what it says, and has acquired its speech from that of a normal person. A defect of this description is termed *idioglossia*.

6. *Stammering and stuttering.*

Stammering, or stuttering, is a spasmodic affection leading to a sudden check in the utterance of words, or to a rapid repetition of the consonantal sound, less frequently of the vowel sound in connection with which the difficulty arises. The affection is probably never congenital, but usually appears between early childhood and puberty—after the child has learnt to talk fluently.

Boys are affected five times as frequently as girls—a fact that is particularly interesting, considering that boys usually acquire speech more slowly and at a later age than girls. Heredity only acts as a factor in those cases which occur in children of the nervous temperament, whereas among the children of parents who stammer, or when several children in the same family suffer, the causal factor is imitation. Severe shock or fright has been the immediate cause in some cases, more especially in nervous families, whilst in others the condition has appeared after some severe illness—for example, scarlet or typhoid fever—or seems to depend on what might be called peripheral irritation elsewhere in the body, such as the presence of adenoids, eruption of the permanent teeth, or the presence of intestinal worms. In the production of speech there are several separate mechanisms at work:—

(1.) The respiratory mechanism for supplying the current of air which sets the vocal cords into vibration.

(2.) The muscles of the larynx for the production of voice.

(3.) The muscles of the lips, tongue, and palate for articulation.

For distinct speech there must be absolute co-ordination, both as regards time of action and as regards power, between these three mechanisms.

Professor Wyllie compares those movements which produce articulate speech with the movements of each hand of a violinist. The movements of the larynx he compares to those of the bow-hand of the musician, while those of the tongue, lips, palate, etc., he compares with the movements of the fingers upon the frets; and as it is common for one who is learning the violin to pay too much attention at one moment to the bow-hand and at another to the fingers of the left hand, so, in stammering, the speaker neglects the laryngeal mechanism, and, when no speech is emitted by the attempt, he throws more force into the mechanism of the mouth, which appears to him to be at fault. The nerve centres for this latter mechanism become embarrassed and overstocked with energy, which overflows into other centres, producing the spasmodic efforts so commonly seen in those who stammer. In most cases it is the laryngeal mechanism which is at fault, and its action being delayed, the co-ordination of action of the laryngeal and mouth movements necessary for distinct speech is lost. Hence stammering occurs over the consonants, especially the voiceless consonants—for example, "p," "f," "t," "th"—and not upon the attempt to produce vowel sounds.

In some cases the action of the mouth mechanism is delayed, and then the child stutters over an initial vowel sound. A vowel has been defined "as a modification of an original quality of tone produced by the vibration of the vocal cords in the larynx, due to resonance in the cavities above the larynx, mouth," etc. In the natural vowels "i," "e," "a," "o," "u," the first is produced with a small mouth cavity and a small opening between the lips. In the production of the succeeding vowels the size of the mouth cavity is progressively increased, the opening of the cavity being progressively increased in size in "e" and "a," and diminished in "o" and "u." These are well illustrated in the three sketches of Fig. A.

* *Practical Teacher*, February 1911.

Consonants are produced by the sudden or more or less complete interruption of the breath by the contact of the walls of the mouth cavity in certain positions known as the "stop positions." This contact is usually

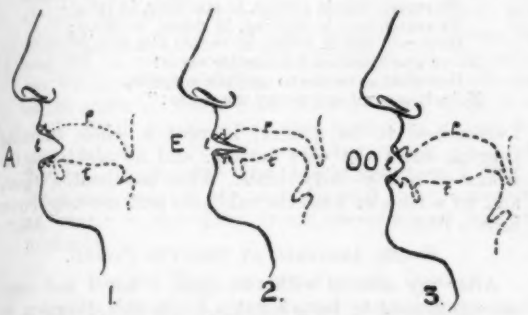


FIG. A.—POSITION OF LIPS AND TONGUE IN PRODUCING VOWEL SOUNDS.

l, lips. *p*, palate. *t*, tongue.

between the tongue and various parts of the roof of the mouth. The three drawings of Fig. B illustrate this.

They are divided into "voiceless" or "voiced" consonants, according to whether they are purely sounds produced by the mouth cavity, or have in addition an accompanying voice sound. The chief "stop positions" indicated are :—

(1.) Lip stop position, where the lips are in contact at the commencement of the sound—for example, B, P (Fig. B 1).

(2.) Pressure of the tip of the tongue against the back of the upper teeth—for example, T, D are thus formed (Fig. B 2).

(3.) By approximation of various parts of the back of the tongue to the roof of the mouth (hard and soft palates). Thus are produced the consonants K, G, S, Sh (Fig. B 3).

The chief difficulty that stammerers experience arises first in connection with the utterance of initial consonants, especially the voiceless explosives. The child makes an attempt to speak without first filling the chest with air, thus showing there is a lack of co-ordination of the respiratory muscular mechanism with the muscular apparatus of the mouth. He closes the mouth cavity at one position (the position varying according

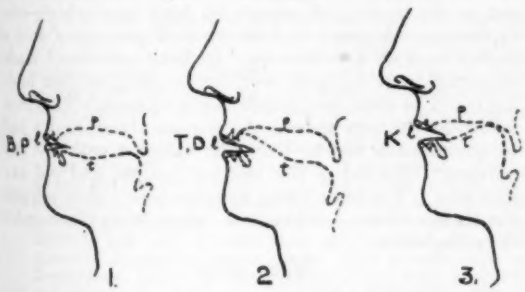


FIG. B.—DIAGRAM OF LIPS AND TONGUE IN VARIOUS "STOP POSITIONS."

l, lips. *p*, palate. *t*, tongue.

to the particular consonant to be articulated) and then, instead of allowing the vowel to follow the initial consonant immediately, he presses his lips on his tongue and his teeth or his tongue and his palate (according to which particular "stop-position" is required) more firmly than is necessary. Hence the explosive escape of breath does not take place. In the worst cases the other muscles of the face, and even those of the neck, become spasmodically affected, and the stammerer may become so agitated that his pulse becomes markedly increased and perspiration appears on his forehead or body.

7. *Treatment of stammering.*

In very young children a cure may sometimes be effected by insisting upon the repetition of the letter over which the patient stumbles until it can be articulated smoothly and properly. Both in these and in older children the teacher must gain the full confidence of the child, and do all that is possible to direct his energies towards the "vocal element," and to make his voice as far as possible a continuous one.

Hence respiratory control and lung expansion must be increased by regular deep breathing exercises; and these, together with singing exercises, should be the first essential in treatment, the one object being to promote co-ordinated action between the various groups of muscles which I have described as being connected in the production of articulate speech.

Various sentences, such as the following suggested by Mr. Lowry, should be practised over and over again: "Black babbling break brawling o'er their bounds." "We wildly wish while wiser workmen win whate'er will worth reward." "Serpents and snakes were scattered on the sea." Other similar sentences can be adopted to suit the individual case. The child should be made to speak slowly and distinctly, at every few words taking a deep inspiration, and commencing to articulate the word at the exact moment expiration begins. Should this be accurately carried out, especially before any word that is difficult for the child to pronounce, co-ordination is obtained, and such word safely and correctly spoken. In addition, the general health must be attended to; cod-liver oil and malt, with abundance of fresh air, being essential, and any irritation, such as decayed teeth, adenoids, or worms, appropriately treated. Nervous or shy children should be removed from school for treatment—in fact, as treatment must be "individual," all cases are better treated in private. As slovenly habits of speech in a teacher are so soon imitated by the child, the teacher MUST be one who articulates slowly and distinctly. Finally, though practically all cases can be cured by these means, it must be clearly understood that the child will not "grow out of it," and that chance of success becomes less the older the child is before treatment is begun.

Sites Délaissés d'Orient (Du Sinaï à Jérusalem) : ouvrage illustré de 47 gravures tirées hors texte et d'une Carte en noir : par C^te^ Jean de Kergorlay. (*Hachette et Cie.*)

Accompanying the professors and pupils of L'Ecole biblique de Saint-Etienne de Jerusalem on their educational tours, the author has visited, and here describes, many of the ruined sites of antiquity which are very seldom visited by Europeans. The ancient Egyptian mines of Sinaï, the convent of St. Catharine, the hermit city of Feiran or Pharan, Petra with its rock-tombs and temples, and finally the ruined twelfth-century fortresses erected by the Crusaders of France in their principality beyond the Jordan are carefully described and beautifully illustrated. It is an uncommon type of book, and its perusal brings before one many facts of which the average reader knows little.

Back to the Land.

THE EXPERIENCES OF A NOVICE.

"The nesting birds, at break of day,
To greet the glorious rising sun,
Trill out their hearts in sweetest lay
For yet another day begun;
And all the earth its tribute brings,
To welcome the returning spring."

I SUPPOSE there is a time when one must cease to be a novice, but it is certainly very convenient to keep to this designation as long as possible. Like ignorance, it covers a multitude of sins! Folks make excuses for me now, but later will judge me by a different standard. So my apprenticeship must not be too hurriedly shortened. Each day one is accumulating a valuable store of knowledge. It is principally in little things, but it is these very little things that matter. Take the weather as an illustration. I know now that if the meteorological authorities announce that there will be "strong S.W. winds with a gale in places," this very identical spot will sure enough have that gale. Such a forecast never fails now to make me hurry round and make things ship-shape. Roofs of brooders have heavy stones piled on them, and the roughly-made chicken shelters are made fast by long and heavy pieces of timber. The beehives are now left permanently supported, as I have no desire to have any of them upset again. The doors of my fowl-pens have a happy way of opening by themselves in windy weather, and then out walk Mr. Rooster and his wives. Fighting follows, and it is a very lively job getting the birds back to their right pens. At the time of writing we have had a gale blowing for nearly a week. When feeding the hens with corn at the top of the meadow, one has to be careful, or the corn on leaving the hand takes wing and flies over the hedge. The egg basket, too, has had some miraculous escapes, especially on the slippery piece by the gate. The fowls know that the food comes in by this gate, and they hold meetings here at the regular hours of feeding, discussing, I suppose, what sort of breakfast or supper is coming, hence the muddy nature of the entrance.

It is surprising what a lot of time is required to look after a hundred odd birds. Although my meadow is wire-netted the whole way round, the birds have been getting under or over, and playing fast and loose with the cabbage in some cottagers' gardens. One trespassing hen got her leg caught in a rat-gin, and then there was trouble. She was badly wounded, but, after being bathed a few times with Condy's fluid, soon got all right again. Last Sunday a fine red Sussex cockerel got into these gardens. He had sense enough to push his way under the wire netting, but had no idea how to get back. A nice Sunday afternoon's diversion—little needed—to get this bird back without pulling up the wire, and without going round by the road to the cottages! I did everything I knew to coax that bird down through the hedge to a place where he could get back into the field. I tempted him with corn until he could eat no more, but still he refused to follow my idea, preferring his own, which was to get out by charging blindly at the netting. Then I began to lose my temper, and treated his lordship to similar language to that used on a memorable occasion to the jackdaw of Rheims:—

"He cursed him in eating, he cursed him in drinking;
He cursed him in coughing, in sneezing, in winking;
He cursed him in sitting, in standing, in lying;
He cursed him in walking, in riding, in flying;
He cursed him in living, he cursed him dying—
Never was heard such a terrible curse!
But what gave rise to no little surprise,
Nobody seemed one penny the worse!"

Determined to be master, I spent a whole morning pegging down the wire netting, and at night cut the wings of nearly forty birds. This has beaten them, and for a time at least the cabbages and my neighbours have a rest.

Fresh Arrivals at the Pig Pound.

After my success with two pigs, I felt I had some encouragement to launch out a bit in this direction, so I started at once an addition to my pig-sty. There is no doubt I did wisely to build really sound and lasting pig-sties. The first one cost me in material just two pounds; but the additional one will cost less, as there are only three sides to build. It may interest those who have a wish to keep these *pets*, either for *pleasure* or profit, to know that with care they need not be a nuisance to any one. My sties are hardly more than fifty yards from the house, yet there is nothing to cause any one to make unkind remarks. The sty, however, must be well drained, and always well littered. The inside measurements of my twin sties are six feet by six feet, and the outside runs eight feet by six feet. I had some little difficulty in finding young pigs locally at this season of the year, so I asked my friend the higgler to be on the look-out for me. To my surprise he arrived one morning with five tiny pigs. He said they could not be parted—I must take the lot or none. I bought the lot, and paid cash for them. Fancy five hungry pigs to feed three times a day! The price was twenty-two shillings each. I dare say I shall be told that I paid too much for ten-week-old pigs, but it is better for a novice to do this, and get them from a reliable source. It is a very risky matter buying pigs in the open market, unless you are an expert. I am more than pleased with my little lot. They were timid and shy at first, but not now. At present they are together in one sty, but they will have to be separated soon, as it is so difficult to feed them. Only this morning one got in the bucket, all except his hind legs, which were in the air. A great deal of the swill got upset, and a pretty mess all five were in. In both my sties I made swinging doors to open over the troughs, so that feeding could be done in a gentlemanly manner. This trick failed, as the pigs moved the trough about, and I had to go into the sty to fetch it. After I sold my two porkers, I discarded the wooden trough, and got two iron ones. The same thing happens now—they will pull the trough about, so that it is never in its place under the swing door.

More Eggs.

I am glad to say my pullets are coming on to lay at last. It was disappointing having to feed them all the long winter with nothing to go against the corn bill. However, I hope they will go ahead now before the price quite falls to one shilling a dozen. Curiously enough, a lot of the pullets started to lay on the same day. A pen of ten pullets gave us five eggs in one day, and this was their start. Another pen of seven started

with one egg per day, increasing in a week to five in one day. This will now give us plenty of eggs for sittings, besides for sale. The incubator (Tamlin's) is due again next week, and I hope it will materially increase my stock. I hope to start this week my large Cypher machine, but it takes two hundred and forty eggs to fill it. It need not, however, be quite full, and can be used even for one hundred eggs. I cannot say we have had any great success with our incubators, as we suffer so much from chickens being dead in the shell. Both machines are now located in a spare bedroom, as the outhouse proved last spring so unsatisfactory. During the first hatch this year I was up sometimes twice in the night to read the thermometer, as, owing to the sharp frosts prevailing, it was very unsteady.

Heavy Work in the Market Garden.

There is certain work that must be done in the market garden in February, and it is by no means such pleasant work as later on. As soon as the land has recovered from rain, I have been digging and sowing. My first sowing was two long rows of broad beans, followed by five shorter rows of early peas. Now, at the time of writing, I am planting shallots and making my strawberry bed. But the land is heavy and wet still, and it takes twice as long in consequence to prepare a piece of land for sowing or planting. I have been wondering if it would pay me to purchase one of the much-advertised cultivators, that could be worked by hand labour. The one I am thinking of is called the "Planet Jr." It consists of either a double or single wheel, and is fitted with a hoe, plough, rake, and cultivators. It is pushed along in the same manner as a lawn-mower. Before finally deciding, I should like to get in touch with some one who has used one. My object in getting one would be, first, to save time, and, secondly, to lighten the labour. None of us are growing younger; and when one has not been brought up to the plough, this heavy garden work pulls one about a good deal. I am glad to say the heaps of decayed turf have disappeared. Some has been sold, some exchanged for fruit bushes, and some has been put back on the land. During this last undertaking the old wheel-barrow collapsed. When I took it over, it always fell on its side as soon as its legs rested on the ground. I put a new top to it, and strengthened its weak parts. Now one of the handles has broken off, and I have had to put in a new one made of two-inch wood. I have not had time to properly shape the handle, but for all practical purposes it is still a going concern. It is about the most indispensable thing on the holding. Some day there will be nothing left of the original wheel-barrow except the wheel, which I cannot make.

The bees have been out several times on fine days, and I have found here and there a dead one in the fowls' drinking vessels. This shows, I suppose, that they are wanting water to mix with their candy. I have now placed a vessel of water in the apiary, with a piece of floating wood in it for them to stand on; otherwise they are liable to get drowned.

To-night it is still cold enough to draw up to the fire, but the day has been a brilliant one, following a white frost. Everything shows signs of spring: the honeysuckle by the garden gate is quite out in leaf, and the long row of primroses is showing up green, but we are late in these hilly parts for the early flower. We have just been counting up the days, and discover that when this appears in print we shall have been twelve months on our holding. We might still have been trailing over London Bridge morning and evening, and watching both the flowing tide to the sea and the flowing tide of tired men and women to their homes. To-morrow I shall be sowing and digging, fetching and carrying, all the day long. I shall be dead tired at night; but this, with all that it means, is the life for me.

Experiments in Dramatic History.

BY FRED. E. MELTON, SHENLEY, BUCKS.

(*Continued from page 600.*)

Summary.

WITH the death of Rufus the succession fell upon Robert, a young brother, absent from the country, fighting in the Holy Land. A still younger brother, Henry, availed himself of the opportunity, and was proclaimed king. Born in England, he was a favourite with the English people; and he further endeared himself to them by his marriage with Matilda, a princess who claimed descent from the early English kings. Just and firm, he was able to uphold the rights of his poorer subjects, whilst holding in check the rapacity of the barons. The loss of his son Henry, shipwrecked at sea, was a great blow to him; for his daughter, Matilda, was not fitted to rule a country under the prevailing conditions. Yet he persuaded the barons to swear fealty to her, and obtained their promises that she should be Queen of England after his death. This promise some of the barons kept, but by far the greater number, headed by Stephen, a nephew of the dead king, disregarded their oath. Matilda, in some ways, was to blame for this; for she was of a proud and overbearing nature, whilst Stephen was a man of pleasant and generous disposition.

Yet as a ruler he was not successful, and England entered upon a period of constant unrest during the nineteen years Stephen held the throne. The barons warred and plundered at will, and civil war kept the country in a state of turbulence hitherto unparalleled. On the death of Stephen, the son of Matilda came to the throne under the title of Henry II.

Although most of his life had been passed abroad, he was possessed of the needed character to quell the English barons. Passionate yet just, he soon earned the respect of his subjects, but at times blind anger swayed him. His first act was to curtail the power of the barons, and put down the numerous bands of robbers who had worked their will unchecked during the lawless days of the past reign. This he was helped to do by the energy and foresight of Thomas Becket, who had been raised from the position of a merchant's son to that of Chancellor of the Exchequer. So justice was re-established in the country.

But a further reform brought much trouble to him. The Church, with its laws of penance and absolution, claimed jurisdiction over all those persons in any way connected with the work of the priesthood. Henry desired that every evildoer, whether cleric or layman, should be tried in the civil courts, for the Church law enforced lighter punishments for criminal offences than did the king's justice. The Church refused to accept Henry's wish, and, to further his will, when opportunity arose he proclaimed his friend Becket Archbishop of Canterbury.

This step aroused violent opposition from the clergy, but Becket himself became a changed man. Far from furthering the king's will, he strenuously opposed it in the one direction where the king needed his aid. The barons, fired by the hatred caused by Becket's early acts, combined with the clerics envious of his position. Together they worked upon the anger of the king until Becket was forced to flee the country. To further vex Becket, Henry caused his son to be crowned as king by the

Archbishop of York; an office hitherto the prerogative of the Archbishop of Canterbury. Although incensed by this, Becket was able to make peace with the king; but whilst Henry was in Normandy Becket returned to England, and pronounced sentence of excommunication upon all those who had aided in the coronation of the younger Henry. The Archbishop of York, with those others affected, crossed to Normandy to invoke the aid of the king, and so stirred his resentment that Henry expressed a desire that Becket was dead. Four knights, fired by an unholy zeal, thereupon made their way to England, and, finding that Becket obstinately refused to remove the ban of excommunication, slew him on the altar steps of Canterbury Cathedral.

Play VIII.—The Death of Becket.

CHARACTERS.

HENRY II.; THOMAS BECKET, Archbishop of Canterbury; ROGER, Archbishop of York; SIR REGINALD FITZURSE, SIR RICHARD DE BRITO, SIR WILLIAM DE TRACY, SIR HUGH DE MORVILLE, knights of the king's house; QUEEN ELEANOR, wife of Henry II.; GRIM, a monk; citizens and beggars of Northampton; knights and ladies of the court of Henry II.

SCENE I.—A STREET IN NORTHAMPTON.

Time, 1165 A.D.

[*Men and women, passing to and fro, intent on business; beggars, some seated by the roadside, others standing, asking alms from passers-by; occasionally a monk or man-at-arms passes; enter two citizens, carrying long staffs, and walking slowly whilst talking together; some of the beggars crowd towards them.*

BECKET PASSING THROUGH THE STREETS OF NORTHAMPTON.

First Citizen. Such is the archbishop's shabby following [*throws coin towards the beggars*]. Away with you [*the beggars scramble for the coin, and then fall back*].

Second Citizen. Shabby they may be, but they be faithful at least. The name of Becket stirs these men as the king's name never did.

First Citizen. [*Standing and looking thoughtfully towards the group*] 'Tis a change, and a great one. Not many months ago it was the barons and the rich who hung upon his words. "The great chancellor," said they. Now [*shrugging his shoulders*] the beggars bless him as the good archbishop.

Second Citizen. Many are the tales I have heard of his great wealth and the feasts he gave, which even the king himself did not match for splendour. What has changed the man?

First Citizen. Mother Church, friend, Mother Church. The feaster has turned faster, and the king's companion become the beggar's comrade.

[*They turn and begin to walk on. Enter a third citizen, who greets them; they pause once more, and form a group in the middle of the road, talking quietly.*

First Beggar. [*Turning to the others*] Our Lord Becket will pass this way anon.

The Beggars. [*Together*] Bless him!

Blind Beggar. Ay, bless him! for he's like own brother to us all. But yesterday he took me by the hand [*holding up his hand*], this hand, rough and dirty as it must be, and led me to his house as if it was mine own.

Lame Beggar. [*Stepping forward*] That would he, were you filthy as the kennel. He has fed me for days. By the Lord, he *says* he's our brother.

Fourth Beggar. Scabs or filth, ragged or naked, we be all his children, my masters.

Beggars. [*Together*] God's blessing on him [*they continue muttering to one another*].

Third Citizen. [*To friends*] They say that the king's favour is gone from Becket.

First Citizen. Idle gossip, friend, for the king has made him what he is.

Second Citizen. Maybe; but kings change.

Third Citizen. As Becket has done, eh? Rumour hath it that he refuses to do the king's bidding, and so they have quarrelled. His goods are to be taken from him, and the barons already begin to forsake his house.

First Citizen. Such is a king's favour. Lose it, and you lose your friends.

Second Citizen. And your life belike. [*Turns suddenly*] What is this?

[*The others turn, and then move to the side of the road as the beggars limp and rush forward, shouting, "The great archbishop! Our Lord Becket! Way for our noble lord!" Enter Becket, followed by four monks. The people fall back, and kneel or bow their heads as he passes. The beggars fall on their knees, and hold out their hands in supplication to him, shouting, "Blessings on your noble lordship!"*

Becket. [*Stopping*] Ah! my poor friends, little ye know how much I need your blessing. [*Turning to the monks*] Give them what ye have. They will not scorn the gifts of Becket as do their nobler brethren.

[*He lifts up his hands in blessing, and passes on as the monks scatter money among the beggars and follow after. The beggars fight amongst themselves for the money as the people once more begin to pass to and fro on their way.*

First Citizen. Did ye notice that he said he needed their blessings?

Second Citizen. [*Nodding his head*] That did I!

Third Citizen. Said I not the king was angry with him? Who comes?

[*Enter the four knights; the beggars rush towards them.*

Fitzurse. Away, you filthy knaves [*sneering*]. Go, seek alms of your father Becket.

Beggars. Bless him! God keep him!

De Brito. [*Angrily*] Bless him, you scum? Bless the man who is unfaithful to his king? Away with you [*striking with his hand at the nearest beggar*].

Blind Beggar. Ay, bless him; he feeds us.

Lame Beggar. We be not filthy scum to our Lord Becket.

Fourth Beggar. We be his brethren, my noble masters.

Fitzurse. 'Tis a dirty brotherhood [*drawing and striking with the flat of his sword*]. Now stand aside and let us pass.

Blind Beggar. [*Coming forward, tapping with his stick*] Alms, noble lord, alms.

De Morville. 'Tis eyes ye lack, dirty rogue.

Blind Beggar. My Lord Becket sees for me, bless him!

Fitzurse. [*Impatiently*] Get ye gone.

De Tracy. [*Putting his hand to his dagger*] Ye shall lack tongues to mouth your blessings. Begone!

[*The beggars stand aside muttering, shaking their sticks threateningly as the knights pass on, and then hobble after them, talking fiercely to one another. The three citizens walk slowly in an opposite direction.*

Third Citizen. So the barons openly scoff at Becket?

First Citizen. A sure sign that the king's favour has passed from him.

Second Citizen. Well, maybe 'tis so; certain it is that the barons bear him no good will.

Third Citizen. Archbishop or no archbishop, I would not be in Becket's place this day.

[*They pass out talking.*

SCENE II.—THE KING'S APARTMENTS IN A CASTLE IN NORMANDY.

Time, 1170 A.D.

[*Groups of ladies and nobles scattered about the chamber. King Henry and Queen Eleanor seated at one end, whilst behind them stand the four knights. All are engaged in conversation, when a voice is heard outside.*

"Room for his Eminence the Archbishop of York."

The King. [*Starting, and turning to Queen Eleanor*] What wants he here in Normandy?

[*Enter Roger of York. He walks slowly forward, and stopping a few paces away, faces the king, who has risen to greet him. The groups break up, and all stand attentive to what is passing.*

Henry. Welcome to Normandy! Yet; Roger, there is but little brightness in your face.

Roger. There is grave reason for my mood, your grace.

Henry. Grave reason! What mean you?

Roger. [*Slowly and distinctly*] Reason that affects the welfare of your realm.

Henry [*Striding forward*] The peace of England! Read me this riddle, I prithee.

Roger. Ye but lack the key, my liege.

Henry [*Stamping his foot impatiently*] Tarry not, my lord; we grow impatient.

Roger. It was by your wish, my lord, that I crowned the prince Henry, your son, as king?

Henry. [*Passionately*] Yes, yes! Well?

Roger. Becket has returned to Canterbury, my lord.

Henry. Methinks my wit grows dull as my temper sharp. Becket has returned, say you, but he is my friend once more.

Roger. [*With emphasis*] Your friend, my liege, but none of ours who do your will. We who but obeyed your wishes in the crowning of your son are excommunicate.

[*The nobles and ladies gather in groups, and whisper excitedly together.*

Henry. [*Stepping back, and catching hold of the side of his seat*] Excommunicate! Has he dared?

Eleanor. At last, my lord archbishop, you come to the root of the matter. [*Turning in her seat to Henry, who is standing deep in thought*] What other ruin shall this man bring upon your kingdom? Is gratitude dead that such as he, lifted by your royal will from poverty to greatness, should so repay with deeds of evil the one who raised him?

[*Henry seats himself, frowning angrily, and then looks up.*

Henry. Peace! peace! I say he is again my friend.

Roger. [*Moving closer to the king*] With me are Gilbert of London and Jocelyn of Salisbury. What have we done that obedience to our sovereign brings such punishment in its train? We ask but justice at your hands, my liege [*falling to his knees, and holding out his hands in the direction of the king*].

Eleanor. [*Rising*] Is the king's word so light that such a man as Becket can make it null and void? Is your power so small that those who do your will have no protection? Then are we ruled by Becket, and Henry is but make-believe and sham.

Henry. [*Rising, and pacing to and fro*] How you all hate him! Yet he has dared me once again, and I do not brook such actions. Whilst hatred breeds your words, the welfare of my state must rule my mind.

[*Roger of York rises from his knees.*

Eleanor. [*Angrily, and with derision*] The state! Why prate of state when all your power is dead?

Roger. The church is cut in twain, and peace has gone from us for ever.

Henry. [*Turning fiercely*] You drag me on to rashness. Is there no man who can preserve peace for me? [*flinging his arms out*] Is there none among you who break my bread will rid me of this priest?

[*He turns again, and, with his head sunk on his breast, passes rapidly from the chamber. The nobles and ladies turn and watch him as he goes, and then commence whispering together. Fitzurse speaks quickly to his companions.*

Fitzurse. Draw your swords, cross them, and swear this oath. [*They draw swords and cross them. Fitzurse holds the blades together with his left hand, whilst the others lift their left hands above their heads.*] Swear, here and now, that if Becket refuses to do the king's desire he dies.

De Brito. I swear it.

De Morville. He shall die.

De Tracy. His blood be on his own head.

Fitzurse. [*Releasing the swords*] 'Tis well. To England, my lords.

[*They pass out together, sheathing swords.*

SCENE III.—THE CATHEDRAL AT CANTERBURY.

Time, December 29, 1170, late afternoon.

[*Becket standing on the altar steps. Grim stands a little to the rear on the left-hand side. Other monks kneeling in the body of the church. The door is flung open quickly, and the knights enter unarmed. The monks rise and gather behind Becket quickly as the knights advance. He faces them, whilst Grim steps forward as if to intervene.*

Grim. My lords, what want you?

Fitzurse. Our message is for yon mischief-maker [*pointing to Becket*]. Go in peace!

De Brito. By your action Roger of York is excommunicate. Is this your duty to your royal master?

Becket. [*Boldly*] My royal master can but rule my body; he cannot rule my soul.

De Tracy. Obedience he will have. Wilt remove thy ban from those whose excommunication you have wrought?

Becket. [*Turning away*] Not I. You speak of obedience to

THE DEATH OF BECKET.

the king. Do not Roger of York and the other bishops owe fealty to me?

De Morville. You punish for disobedience, and yet you disobey. Have a care lest your punishment be death.

Becket. [*Facing them once more boldly*] I had rather die than Holy Church should suffer.

Fitzurse. Then die you shall.—Come, my lords, remember your oath.

Others. Ay, we remember.

[*They turn and go out of the church, whilst the monks scatter in all directions, leaving Becket and Grim alone.*

Grim. My lord, they mean you harm. Seek sanctuary.

Becket. That my death is determined on I know. If my office gives me no protection, and this altar no sanctuary, no matter where I go, my life is forfeit.

Grim. My lord, they dare not!

Becket. Alas, Grim, hatred breeds strange actions where sober thought would stand aghast. Many years these men have hated me, and my time is come.

Grim. Fly, my lord! [*Enter barons, fully armed. Grim sees them, and catching hold of the robe of Becket, falls on his knees.*] Alas! too late.

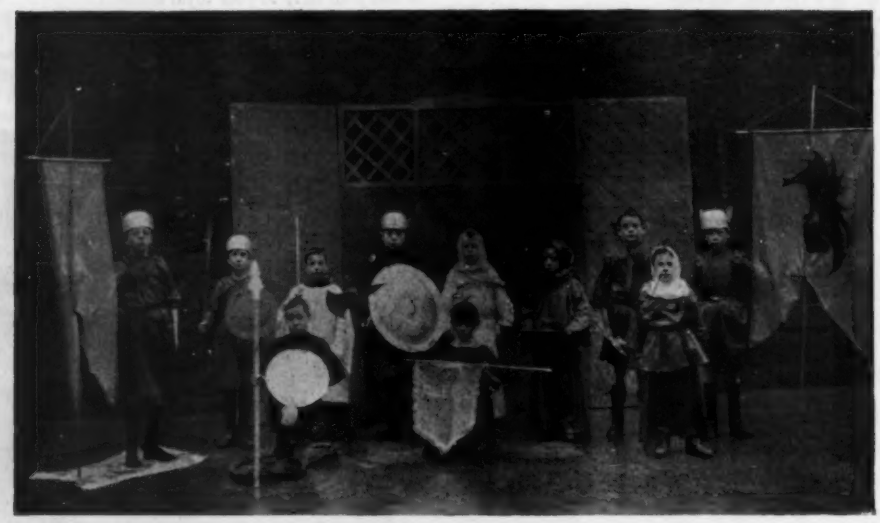
Becket. [*Smiling sadly, placing his hand on the shoulder of Grim*] Have no fear, my son.

[*The knights advance to the altar steps and draw their swords. Fitzurse strides forward, and puts his hand upon the wrist of Becket.*

Fitzurse. Unhappy man, will you obey your king?
Becket. [*Shakes off the grasp of Fitzurse*] God alone is my master!
De Brito. Is it God's work to set your king at defiance?
[*Grim rises, and stands by the side of Becket.*
De Tracy. A truce to argument. Wilt obey or die?
Grim. [*Raising the cross and stepping between*] Sacrilege, my lords!
Becket. Peace, Grim. [*To the knights*] I had rather die.
De Morville. Your blood be on your own head.—Strike, Reginald!
[*Rushes forward. Becket throws him off. Fitzurse raises his sword and strikes; but the blow falls on Grim, who falls wounded. Becket raises his hands above his head and looks up.*
Becket. Into Thy hands——
[*De Brito stabs him, and he falls to the floor. The other knights strike him as he lies. Fitzurse bends over him.*
De Morville. Is he dead?
Fitzurse. Ay, dead.
De Brito. Away, my lords.
[*They rush out, leaving Becket and Grim lying on the altar steps.*

BLACKBOARD SKETCH.

1. The struggle between king and church continued to the reign of Henry VIII.
2. The barons hated Becket (*a*) because he was not of noble birth; (*b*) because Henry made him chancellor.
3. The bishops hated Becket because Henry made him archbishop.
4. Becket as chancellor lived in almost royal style, and put the king before all others.
5. As archbishop, he lived a life of self-denial, and placed the church above the king.



FOLLOWING THE LEAD.

INCIDENTS FROM THE "LIFE OF ALFRED THE GREAT."

BY G. R. CHADWICK.

THESE incidents were taken as part of the regular history lessons in Standard III., with at first no intention of going any further. However, the children performed so well that it was decided to use the play at the exhibition of work held at Christmas.

Two performances were given at Brunswick Wesleyan School, one at Cranmer Wesleyan School, and one (by request) at Loraine Street Council School. The group was photographed and published with a descriptive paragraph in the *Liverpool Weekly Mercury*.

The incidents were taken from *Alfred the Great*, by Miss Macdonnel, whose fine historical plays are published by Messrs. George Allen and Sons, under the patronage of the League of the Empire. 1. Alfred at Athelney—defeat; 2. Alfred at Ethandun—victory. The parts were learned by the children in their own time, and given occasionally as part of the history lesson—a few final rehearsals and the making of the costumes being all that was necessary to form an entertainment. The writer is indebted to the drawings by Mr. F. E. Melton, for several designs for the properties used.

The keen interest taken by the children, and the critical spirit which they show, well repay any extra labour which may be involved in teaching history in this manner. All the properties used are made by the writer, the costumes being kindly made by the headmistress of the infants' department. The total cost of the whole was 18s. 6d., being an average of 1s. 8d. per head for eleven boys. It is intended to produce a more elaborate exhibition during the present year, in which all the class may take part.

NEXT MONTH

OUR SPECIAL LADIES' NUMBER

WILL CONTAIN AN ARTICLE ON

DRAMATISATION OF HISTORY,

BY THE

Head-Mistress of the Girls' School, Clewer St. Stephen, Windsor.

Illustrated with a number of excellent Illustrations.

MODERN SCIENCE NOTES.

BY J. G. M^cINTOSH, B.SC., SECONDARY SCHOOL, GATESHEAD.

The Teaching of Kinetics.

UNTIL quite recently the teaching of experimental mechanics in the laboratory has been chiefly upon statical lines. The practical difficulty which arises in the measurement of time has probably been largely responsible for this. Cheap stop-watches are easily broken, and the cost of repair practically amounts to the cost of a new instrument. Electric chronographs are expensive luxuries, and generally beyond the reach of the ordinary laboratory equipment. Even then they are not always suited to the experiment which the thoughtful teacher wishes to devise for the elementary student.

The development of the subject on kinetical lines has also been largely hindered by a traditional belief that the proper educational method of approaching the subject was wholly from the statical side. In the very early stages this is to some extent true, but even then kinetical problems are so much more interesting, and appeal so strongly to the ordinary boy, generally through the medium of his bicycle, that I have found a judicious blending of both to be mutually advantageous.

After all, the problem of locomotion is growing daily in importance. Modes of transit are developing so rapidly that insensibly we are being driven in the direction of the practical study of kinetics.

Educationally the study of the laws governing motion in a practical manner is of even greater importance. The experiments which may be devised give such splendid exercise in graphic work—the establishing of empirical formulæ and the notion of a rate—that it is nearly criminal to neglect this important branch. Did not Newton practically frame the notions embodied in the calculus on experiments conducted in kinetics?

For many years, being disgusted with the ordinary methods of measuring time, I fell back upon the method adopted originally, I believe, by Galileo. A little historical research into the development of a subject often provides the solution to many a problem confronting the science teacher.

This method consisted in weighing the mass of water flowing into a beaker during the time of duration of the experiment, care being taken to sustain the water in the original reservoir at a constant level by means of a siphon. The method gives very accurate results, but is very tedious, and detracts a great deal from the interest of the experiment.

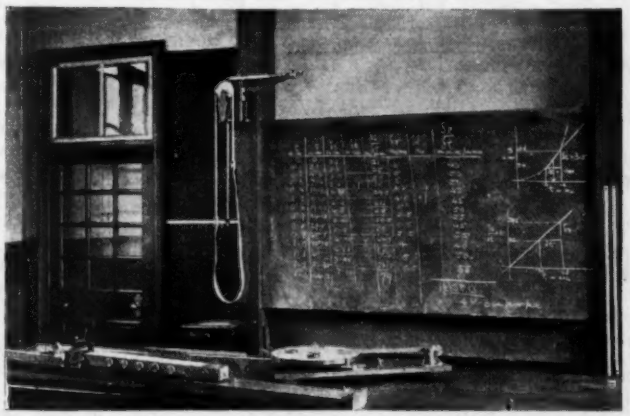
Some years ago I adopted the expedient first devised, I believe, by Mr. W. C. Fletcher of the Board of Education, and described by him in the *School World* for May 1904. This method is really a modification of the old experiment with the tuning fork and the falling glass plate. I remember having seen somewhere—I think in Professor Perry's laboratory—this method employed to find the velocity of the rim of a wheel.

The objection to its general use lies in the difficulty which young students find in manipulation. To overcome this, Mr. Fletcher used a strip of steel about 18 inches long, clamped at one end, and carrying a fine paint brush at the other. This spring is placed so that it vibrates at right angles to the path of the moving body, to which is fastened a strip of paper. The inked brush then traces upon the paper a sinuous curve, the wave lengths of which give the velocities, and the increments in the wave lengths the accelerations.

Originally the idea was adopted to determine the motion of a body down an inclined plane (see photograph). The body was a long trolley, weighted by pieces of metal inserted at regular intervals. This piece of apparatus can be used to demonstrate the relation between the distance traversed and the time, to give clear experimental ideas of velocity and acceleration, and to demonstrate approximately the truth of Newton's second law, that "acceleration is proportional to the accelerating force." The reader is referred to *Eggars's Mechanics*, chapter iv. (E. Arnold, London), for a full description of the method of procedure.

The photograph also represents the adaptation of the method to the Atwood machine by Mr. G. Cussons, Technical Works, Lower Broughton, Manchester.

This form of machine is by far the most efficient yet placed on the market. Its workmanship is thoroughly good and the price reasonable, the method of obtaining a simultaneous release of the vibrator and the falling body being exceedingly ingenious.



As the photograph shows, I have had it fitted in the lecture room in full view of a class. A number of experimental records can be quickly taken and passed round the students. Altogether it is a most valuable item of teaching equipment. The photograph also indicates a further piece of apparatus for the measurement of angular velocity, made by the same firm.

The notion of a rate of increase can be given to a class in practical mathematics by experimental demonstration within the limits of an ordinary lesson, while not the least of the merits of the method lies in the fact that the records are permanent, and may be referred to at any time.

Peltier and Thomson Effects.

The following method of demonstrating the Peltier and Thomson effects is described by Mr. Starling in *Nature* for February 16th ult.:—

"In Fig. 1 the current passes through an Sb-Bi-Sb bar, the points of contact being amalgamated to reduce the resistance. Two coils of No. 36 S.W.G. covered

copper wire are wound on the bismuth, one near each junction, and by means of the leads A and B are placed in the gaps of a metre bridge and a balance produced. On passing a current of 1 ampère through the bars, one

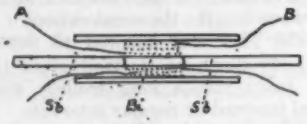


Fig. 1.

junction is heated and the other cooled, which is indicated by a galvanometer deflection due to the change in resistance of the copper coils. The direction indicates a heating where the current flows from Sb to Bi, and *vice versâ*.

"Fig. 2 shows a similar arrangement for exhibiting the Thomson effect. The bent iron rod is heated to red heat at C, and the ends A and B dip into vessels of mercury, thus ensuring a large temperature gradient.

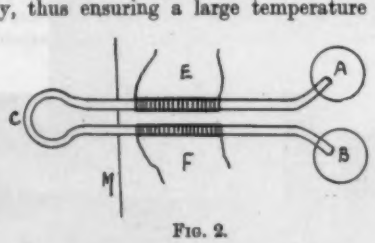


Fig. 2.

On passing a current of 10 ampères in the direction ACB, AC is warmed and CB cooled, showing that the Thomson coefficient is negative. The part EF must be packed in asbestos wool, to prevent heating disturbances from outside."

The Formation of Spheres in Liquids.

In the same issue of *Nature*, Mr. C. R. Darling gives a method of demonstrating spherical formation of liquid in a medium of equal density.

I have tried the experiment which he suggests, and find it works very well. A glass beaker about 10 cm. diameter and 15 cm. high is filled with water at 22° C. to two-thirds of its height. By means of a pipette, 100 c.c. of a solution of 30 grams of common salt in 1 litre of water are discharged at the bottom of the beaker, so as to form a lower layer slightly denser than the water above. A large funnel furnished with a tap, and having a stem 1 cm. or more in diameter, is now placed centrally in the beaker, so that the stem terminates about 7 cm. from the bottom of the vessel. A quantity of commercial orthotoluidine, at a temperature less than 22°, is poured into the funnel, and the tap turned so as to allow the liquid to flow gradually into the water. A sphere of orthotoluidine forms on the end of the stem, the growth of which resembles that of a soap-bubble blown from a pipe. It is quite easy to form in this way spheres 6 or 8 cm. in diameter, and the red colour of the orthotoluidine makes the experiment clearly visible to a class.

The funnel may be lifted out, and the beaker surrounded with a square glass vessel of water at 22° C., and the true spherical form of the drop is then seen.

If the vessel contain water at 15°, the sphere will elongate about a horizontal diameter and sink; whereas if the temperature of the surrounding water be at 27° or more, a vertical elongation will take place, and attach itself to the surface of the water in the form of a hanging drop. This behaviour is due to the fact that orthotoluidine and water are equal in density at 22°, but owing to the former liquid possessing a higher coefficient of expansion, it becomes less dense than water at 22°, and more dense at a lower temperature.

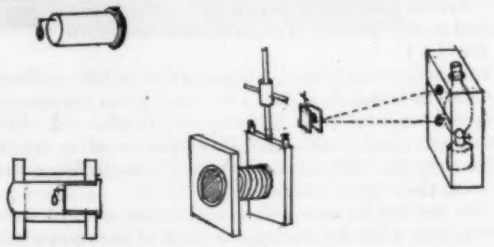
Answers to Correspondents.

I thank a correspondent from Dharapuram in Southern India for his kindly references, and assure him that no query, however small, will be unworthy of attention.

1. To cleanse the tube of the siphon barometer you might try washing with sand and hydrochloric acid. Should this fail, try boiling out with aqua regia. Half fill the tube with aqua regia, and proceed to boil the liquid in contact with the glass at the points where the dirt adheres. It may be advantageous to leave the whole affair standing for twelve hours. I have generally found the most dirty tubes succumb to this treatment. After cleaning the tube, rinse with platinum distilled water, and allow to drain. When the glass is very clean, interference colours will be noticed as the water drains away.

2. To construct a galvanometer for use with Wheatstone bridge experiments, I cannot do better than quote to you the specification given by Professor J. A. Fleming, in his book on *Magnets and Electric Currents*. I had some galvanometers made in the workshop to this specification about twelve years ago, and they are still in good working order.

Obtain two pieces of hard wood ½ an inch thick and 4 inches square, and cut in the centre of each a hole 1 inch in diameter. Make or obtain a stout cardboard tube, 1 inch in external diameter, and 2 inches long, and glue the wooden pieces on to the ends of this, so as to make a short bobbin with square ends. Into the interior of this tube fit a cork which slides easily in; or better still, turn a wooden plug with a projecting edge (see Fig.). Over the outside surface of one cheek



Fleming's Simple Form of Mirror Galvanometer and Lamp Case.

fasten a watch glass or piece of thin mica to close the opening of the tube.

Procure half a pound of double cotton covered wire, of size No. 32 S.W.G., and carefully wind this on the bobbin. Before so doing, it is better to increase the insulating power of the cotton, and prevent it absorbing moisture by boiling the covered wire for some time in melted paraffin wax.

Fix to one of the wooden cheeks two brass binding screws or terminals, and in winding on the wire bring out the inner end of the wire through a small hole made in the cheek quite close to the paper tube, and attach the bared end to one terminal. When the winding is complete, connect the outside end of the wire to the other terminal.

Silver a small disc of microscopic cover glass half an inch in diameter. Full directions for doing this may be obtained from *Laboratory Arts*, by G. H. Woollatt (Longmans, Green, and Co., 3s. 6d.). To the back of this fasten three small fragments of magnetised watch spring by a little touch of shellac varnish *placed on the centre of the mirror only*, the poles being placed in the same direction. The mirror and magnets are then suspended from a *brass* pin stuck into the plug, by a short length of unspun silk.

The plug is then inserted in the tube, so that the mirror and magnets come exactly in the centre of the coil.

It is convenient to add to the galvanometer a short vertical brass wire stuck in one cheek. On this wire is made to slide a cork, traversed by a short length of magnetised knitting needle (see Fig.). This acts as a controlling magnet.

The lamp and scale may be easily constructed from a biscuit tin. Place inside this a small paraffin lamp, cutting a hole in the top for the chimney, and a hole in the side on the same level as the flame about ¼″ in diameter. Place this lamp about a yard from the galvanometer, and by means of a convex lens focus the sharp image of a fine wire stretched across the hole just above it.

This arrangement is very serviceable for use with a home-made Wheatstone bridge, and is moderate in cost.

ORAL ARITHMETIC.

BY AN INSPECTOR OF SCHOOLS.

I HAVE penned a number of articles on written arithmetic, but have not touched on the important subject of mental or oral arithmetic. A book published by Messrs. Nelson called *Continuous Mental Arithmetic* contains a series of very good exercises which should train the children in connected thinking and help them to set out their written solutions on intelligible lines. Therefore I do not propose here to set forth a string of suitable exercises, but to give some general hints on the teaching of oral arithmetic. And first I will touch upon "number" as taught in the infant school.

I have frequently heard teachers insisting on the child giving its answer in a complete sentence. Thus the question is asked: "There are 8 apples in one bag and 7 in another; how many in both?" And the answer expected would be: "There are 15 apples in both bags." The answer "15" is correct and complete in itself. When a child is required to give its answer in a complete sentence, it has two tasks cast upon it—namely, to calculate the answer, and then to express it in a complete sentence. Answering in sentences should never be required when it interferes with quick and connected thought.

One great difficulty experienced in the number lessons of these little ones is in getting the children to *group* rather than *count*. It is a good plan—except when the class is large and the teacher cannot effectively supervise it—to induce the young ones to arrive at their calculations by "doing" for themselves. Thus counters or any other suitable apparatus should be used. But when employed it is a very common thing to see the children using their counters by *ones*. Let me illustrate what I mean.

A child has 10 counters and 5 counters, and he realises that altogether there are 15 counters. The question is then asked: "I have 15 apples, and give 6 away; how many are left?" And the child laboriously takes the 6 away by singles in order to obtain the answer 9. It should be encouraged to take the 6 away in the fewest possible attempts—say by twos, threes, or, better still, the 6 at once.

If children were trained on these lines, there would be less "finger counting" in the upper school.

Many a time I have been asked to suggest a remedy for this counting in *ones*, and I give here one that has proved very effective. The ball-frame is used, and 10 beads placed on one line and 8 on another. Then what I term a "number race" commences. The child who calculates the correct number of beads in the fewest counts is declared the winner of the race. I generally start by counting the 18 in singles, and recording my effort by placing the number 18 on the blackboard, and characterising the attempt as a poor one. I then tell the children that if they can count the 18 in *twos* or *threes*, etc., they will beat me. Probably one comes out and counts in *twos*, and his effort of 9 counts is placed under mine and declared to be better. If he counts in *threes*, 6 is written down. And, lastly, the one who counts in two essays is announced the winner.

In a recent visit to a school I named one boy as the winner who said 10 and 8 were 18, when another boy immediately replied that he could count "at twice," and gave 9 and 9 as his answer.

In this way the number 18 would get thoroughly analysed. Of course, with less advanced children a smaller number would be taken.

In Standard I. the number 24 might be taken in this manner. The 24 nuts are put in a group, and the one who can remove them to another place in the least number of tries is the winner. Thus a child will be led to see that 24 is made up of 12 twos, 8 threes, 6 fours, and so on.

Children taught on these lines will get a good grounding, and the arithmetic would not be so painfully slow as it is in many cases. This sort of teaching in the lower part of the school, and the learning of the multiplication table up to, say, 16 times in the upper part, and the abolition of mechanical and unnecessary side-work, would enable a child to get through much more work than one generally finds done at present.

A useful exercise to set to Standard I. is this:—

56
20
9
18

The numbers are placed on the board, and the children are told there are 4 bags of oranges. They are then asked to raise their hand if they know which bag has most in it, but not to speak; and likewise with the least bag. They are then to reckon how many oranges they would have if the man who had the largest bag and the man who had the smallest bag were to give his oranges to them. Frequently, when giving such an exercise as this to be worked on paper, and with larger numbers, in Standard II., the children have unthinkingly added all 4 numbers; but when asked to get the result orally they are much more successful. This is surprisingly strange, but perfectly true, as teachers may discover for themselves if they make the attempt.

Other questions might follow as exercises in mental arithmetic. Thus: "How many oranges in the other two bags?" "How many more oranges in the largest

bag than in the second largest?" "How many oranges must I put in the smallest bag so that there shall be the same number in it as in the next largest?" And again: "If I take the oranges in the two smallest bags and divide them equally among 3 boys, how many will each boy get?" This last answer should not be obtained by dividing 27 by 3, but the child should be led to see that there are 2 nines in 18, and therefore he has to deal with 3 nines.

A—ANOR.

THIS is the range covered by the first volume of *The 1911 Nelson Encyclopædia*, which is just to hand—literally to hand, for I can sit by the fire and examine it at my ease. It is a handsome little volume, strongly and tastefully bound in dark red cloth, and weighing some twelve ounces. The type is clear and open, the paper excellent, and the illustrations are well turned out: altogether, so far as the outward appearance goes, the little volume is an excellent shilling's worth. Let us test its contents for a few moments. We first assure ourselves that "Ananias" still retains his popularity. Then we turn to the article on the "Aeroplane," which takes up about eleven pages of the book, is on the whole simply worded, contains several excellent diagrams, and concludes with a useful list of aviation records, and a bibliography of the subject. So far this is excellent. All the "Alexanders" are here, including the popular actor who has recently advised teachers to deal with history according to *Practical Teacher* methods. I was disappointed in being referred to C on looking up "Admirable Crichton," for he was more Admirable than he was Crichton. I thought I knew all about "A.E.I.O.U.," but find that the letters express to the initiated the imperial device of the Emperor Frederick III. I shall be specially interested in the I volume, for it may be that I.O.U. may have a less disreputable meaning than it usually carries; you never can tell. Under "Ælfred" we are referred to plain "Alfred," which is good common sense. "Æther" is well treated, and "Afforestation" is adequately dealt with. "Agraphia" is a new nervous complaint, sufferers from which set down with the pen meaningless combinations of words; the disease is now very common. The twenty pages on "Agriculture" make excellent reading. "Mark Akenside's" butcher parentage is duly noted; we suggest that it is really immaterial even to point a moral or to afford a warning. It is almost worth the modest sum which Messrs. Nelson ask for this volume to learn the meaning of "Aldiborontiphoscophornio." Under "Action" we get a column descriptive of the ordinary preparations for a naval fight, which is surely tracking the meaning of a word to its last lair. There are some half-dozen pages of "Adams," but it is to be hoped that "Eve" is to receive separate treatment under E, otherwise there may be meetings about it. On the whole, it is really wonderful how little one misses in turning over the pages of the book. And we once more recommend each of our readers to requisition the volumes as they appear for the school library. For myself I should thoroughly enjoy conducting a research party of intelligent boys or girls through the pages of *The 1911 Nelson Encyclopædia*. It would be a species of intellectual scouting full of adventure and surprise.

THE CENSUS.

MEMORANDUM FROM THE BOARD OF EDUCATION.

1. THE decennial census will be taken on the night of Sunday, the 2nd of April next. The Registrar-General has informed the Board of Education that on the occasion of the census of 1901 his department received valuable assistance through the efforts then made in schools to promote a wide interest in the undertaking, and to instruct the scholars on points of importance connected with the filling up of the census schedule; and he has expressed a hope that he may receive similar assistance on this occasion, and, if possible, in a greater number of schools.

2. The Board of Education, in communicating the Registrar-General's request for assistance, desire to commend the matter to the most careful and sympathetic consideration of all concerned. They have no doubt that the advantages, both from a national and a local point of view, of securing accuracy in the census returns will be recognised by educational bodies, as by other bodies in touch with the public business of the country, and also by teachers; and they are confident that the request for all such assistance as can properly be given in schools will be most favourably entertained, and as far as possible complied with. It is clear that the rendering of such assistance is in no way alien to the legitimate functions of schools, especially those which are aided or recognised by the State; and the Board have every hope that the teachers, upon whose co-operation in this matter so much must depend, will be not only anxious to render a public service, but also quick to recognise the educational possibilities of the census. An event of this kind, affecting as it will every household, cannot fail to be of at least some interest to all but the youngest children in each family, and may not inappropriately be the occasion of a general departure from the ordinary course of school routine.

3. It is therefore suggested that the census should form the subject of one or more special lessons in all classes for older children in public elementary schools. In the majority of evening and technical schools it will probably be sufficient to put up the enlarged copy of the schedule and the memorandum concerning it which has been prepared by the Registrar-General, in order that the students may have an opportunity of studying it for themselves. But instruction may advisedly be given upon it in those classes to the subject matter of which such instruction appears to the Local Education Authority to be appropriate. The more general aspects of the census will readily furnish material for a lesson, or for more than one lesson, suited to the age and capacity of the scholars of public elementary schools. The general purpose of the census and the way in which it is carried out can be made clear even to young children, and they will have no difficulty in understanding or seeing for themselves why the census must be taken on one day, and why one particular day of the week is the best day for the purpose. *The census schedule itself and the manner in which it is to be completed should be taken as the subject of one or more lessons in classes of older scholars or students;* and in connection with the various heads of the schedule some of the principal objects of the census may be explained and illustrated. It may be shown why it is important, both for the locality and for the country, that the number of people of each sex in each town and in each parish should be correctly known; that it should be known how the population of the country as a whole is growing, how the population of each town and parish is increasing or decreasing, and how fast in each part of the country the urban part of the population is growing as compared with the rural part; that the birthplaces of the people, and especially of those who come from abroad, should be known; that there should be accurate knowledge of the trades and occupations carried on in different parts of the country, and of the number of men and women and of boys and girls engaged in the various trades and in the various branches of each trade; that the number of people living in each year of life should be known; that the number of persons who are afflicted with blindness, deafness, etc., should be known; and that there should be complete information about the kinds of houses in which people live. It may be shown, in a general way, how accurate knowledge on such points is of very great service to those who have to watch the health of the people or to consider in what ways their general comfort and welfare can be promoted, to those who have to study the trades and industries of the nation and the occupations of the people both in town and country, and to those who have to consider what kind and number of schools are necessary. In offering these very summary suggestions as to topics which will be found of general interest, the Board desire in no way to prescribe the kinds of lessons which should be given.

Our Art and Handwork Section.

HONOURS PAGE.

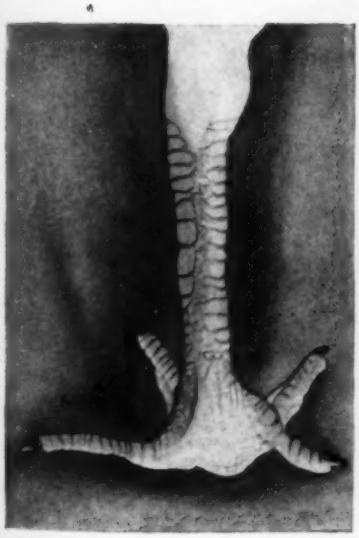
THE coveted prizes this month go to—

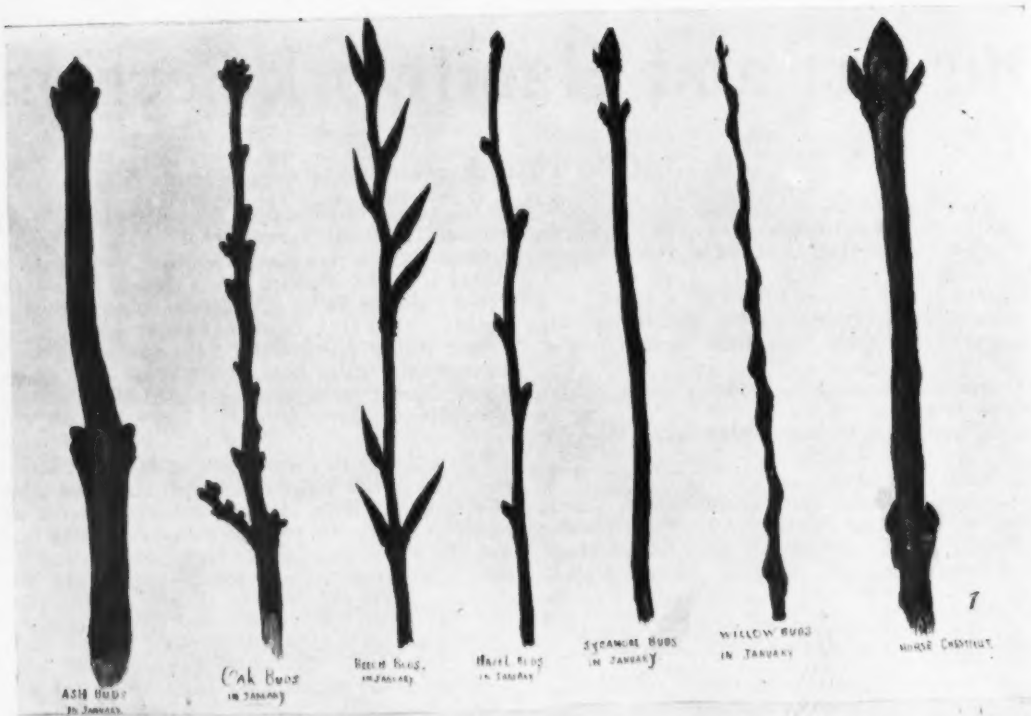
1. Jno. W. West (13), Crewe Green School, Crewe.
2. Charles Murray (14), Garnetbank Public School, Glasgow.
3. Ethel Pitt (12), Loxford Girls' School, Ilford.
4. Stanley Jukes (12), National School, Brierley Hill.
6. John Lindley (12), West Dyke Council School, Redcar.
7. George Steedman (13), Grange Council School, Jarrow-on-Tyne.
8. John Ewing (11), Oatlands Public School, Glasgow.

Commendation is given to—

E. Nance (11), Goodmayes Council School, Ilford; William Reid (13), King Edward School, North Shields; Rose Harvey (13), Campsbourne Council School, Hornsey; William Ward (12), Enderley Council School; Ralph Crow (12), Enderley Council School; William Culpan (11), Booth Town Council School, Halifax; G. Barrow (12), Sulyard Street Council School, Lancaster; Alfred Carr (12), Sulyard Street Council School, Lancaster; Phyllis Fuller (13), Pendre School, Prestatyn; Richard Ward (12), Fairfields Council School, Basingstoke; William Lawford (14), Fairfields Council School, Basingstoke; Flora Lovegrove (9), no school address given; George Coates (10), New Penshaw Council School, Fence Houses, Durham.

The drawings this month are again full of interest, and show a wide range of selection and great variety of treatment. Even such unpromising material as a rough bit of twig can be made a good subject for study, and one which demands careful observation and good execution to suggest the texture of the bark, etc.





HONOURS PAGE.

SOME HINTS ON TEACHING COLOUR.—II.

BY AGNES E. FARMAN.

THE early stages in the teaching of colour—those suggested in last month's issue—may well be taken as part of the winter course, to add interest to and brighten the lessons which, except at Christmas time, are often rather devoid of colour; but there is still a more important advantage to be gained by overcoming, at least partially, the initial technical difficulties of using the brush, mixing and putting the paint on paper early in the school year. It is often found that teachers postpone this part of the work until the season when the greatest wealth of material is procurable; but it is obvious that far better results will be obtained if the children come to their work on the spring flowers, not only with some preparation for the handling of their tools, but also with a certain amount of appreciation and understanding of the varied colours of the spring growths. In all this first practice the children should be taught that painting is really drawing with a brush, whether it be within a boundary line or not; and to emphasise this, opportunity should be frequently given them of making their studies without any pencil sketch, or with only a few leading lines. The leaves and buds of many of the early flowers are particularly good for such exercises; the long flowing lines of the daffodil, snowdrop, and crocus can be well reproduced by a brush (Figs. 1 and 2, and p. 682), and the spirit of the growth can perhaps be more easily obtained with a flexible point than with a pencil. In pencil drawings children often give such leaves a rigidity that conveys no idea of their graceful lines. Afterwards a careful study for details of growth may be made.

Fig 1

As a rule, when form is the aim of the lesson, it is well to take single flowers, but in one primarily on colour; double flowers, such as the daffodils on p. 682, make quite as good a study, since it is the mass of colour which is dealt with rather than the form. With a bunch of violets, a spray of lilac, laburnum, sweet-william, or a head of clover, the mass of colour is again the thing to be aimed at; and this will be rendered much more effectively by direct brush drawing with full rich colour than by an attempt to draw all the small intricate details.

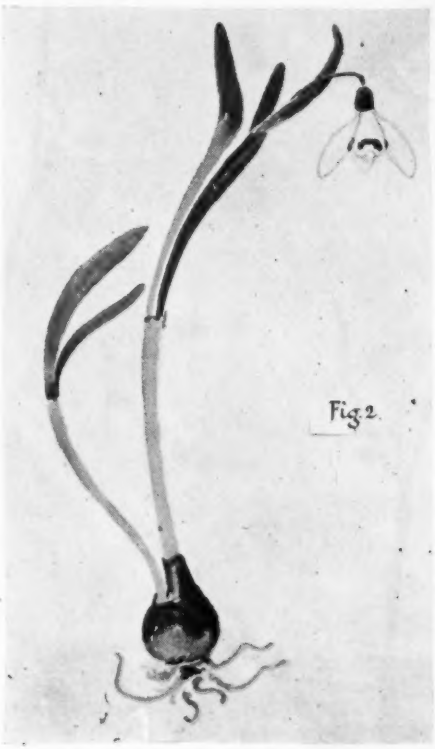


Fig 2.

In all these exercises, whenever the question arises as to what paints are to be used, reference should be made to the experimental sheets suggested in the March number, so that pupils may rely on information they have themselves gained, rather than depend on a mixture suggested by the teacher. If those exercises have been carefully worked out, there should be no difficulty in attempting the gradations of colour, as in the daffodil, ranging from orange in the heart of the flower to paler

SOME HINTS ON TEACHING COLOUR.

yellow on the outside petals, through the yellow-green on the back of the flower to the green stalk and the bluer gray-green of the leaves. So also with the crocus, in which the tint of purple on the petals deepens to the full colour where the flower merges into the stalk, and this again pales down almost to white; the green of the leaves becomes less strong where they enter the sheaths, and these are often tipped with a brownish colour that is again repeated in the corm.

In these lessons the children must be continually reminded of the necessity of having plenty of liquid colour in their brushes: dry colour is never rich or fresh, and necessitates a number of meaningless touches. Liquid colour does not mean washy colour; but whatever its depth, the paint *must* be wet enough to be guided easily and freely over the paper. For junior classes it is not advisable that they should retouch or work over their studies; a bad piece of work should be attempted again. This prohibition of retouching does not apply so strictly to the older pupils, who may carry their drawings further at the discretion of the teacher.

If the colour requires the mixture of several pigments, care must be taken not to overmix them in the palette, for this results in muddy colour. It is best to let them amalgamate only slightly at first, and blend more when brushed on the paper. By this means a greater variety is produced, and variety means interest. Monotonous evenness of colour is never found in Nature.

Besides the brightly-coloured spring flowers, there are also the growths of more subdued tints, which in their way are quite as beautiful, such as the branches of trees with their buds, catkins, and sprouting leaves (Fig. 3); and if these are analysed in the usual way, either on paper or verbally, it will be quite easy to make the children realise the beauty of a quietly coloured scheme.

When these lessons on colour have been carried forward to some extent, exercises may be given to see what the children have learnt, and how they can combine colours themselves in order to make a pleasing arrangement. For example, a geometric pattern may be drawn, a pale tint of any colour washed over the whole, and when this is dry, the pattern emphasised with a darker tint of the same colour, the exercise being to select one which will harmonise with the first wash. Fig. 4 gives two tints of green. This may be followed by three tints of a colour (Fig. 5). The analysis of the colours found in any natural object, such as are suggested in November 1910, and in the March issue of this year, may also be used for the same purpose. The onion on p. 682 is a further example, and any analysis made in this way may be used for an arrangement or scheme of colouring.

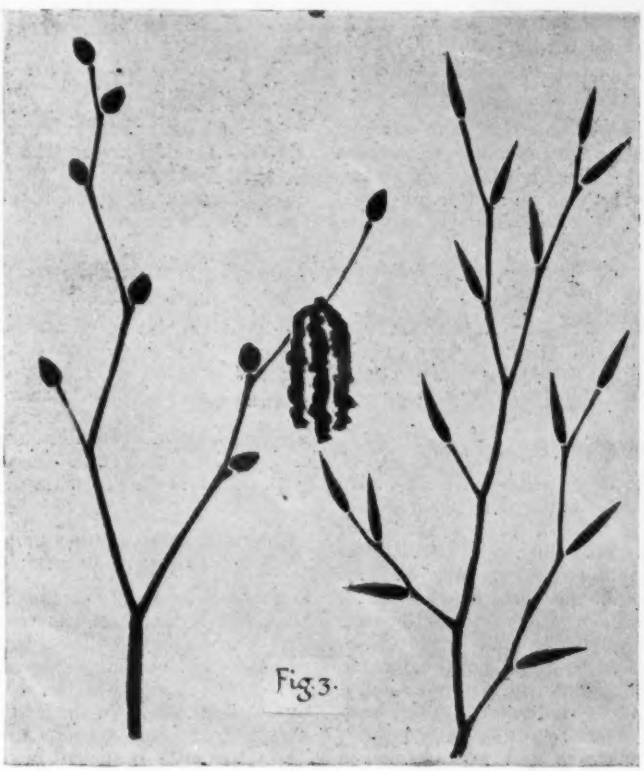


Fig. 3.

As the lesson is supposed to be one on colour, and not on design except in so far as the colour is concerned, the pattern may either be given as a printed outline, traced from some good example, or, as before suggested, set out as a piece of geometric work, and this used as a field for colour experiment. Two examples on p. 682 are shown—one from the onion, and one from the purple crocus. In the latter the spot of orange is suggested by the stamens, though these do not show in the drawing. In analysing schemes of colour from Nature it is some-

times helpful to show approximately the proportion of one colour to another; and it is better to choose things with few colours, and to get the utmost out of these, than to wander over a larger range, which may confuse the children.

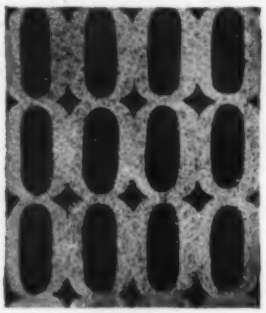


FIG. 4.

In addition to the natural objects, colour schemes may be made from a multiplicity of things, sometimes at first sight unpromising. The rich yellows and browns of a piece of rusty iron, the reds and greens of an old brick wall, the faded colours of an old farm cart, the verdigris on a piece of disused copper—all afford excellent examples.

This study proves both useful and attractive. It appeals to the love of colour innate in all children, encourages in them habits of observation in their search for fresh instances, and increases their judgment and

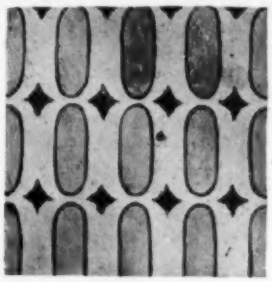


FIG. 5.

perception in its demand on their selective powers; but it need hardly be said that the application of such colour schemes, though begun in this way on paper, should not end here. The end is that the children should be educated so as to appreciate things of good colour, and in after life be able to apply this knowledge in their homes.

ART AND THE BOOK.

BOOK-COVERS.

BY W. E. SPARKES.

THE COVERS OF FINE MANUSCRIPTS.

IN ancient days writings were preserved from injury by covers of various kinds. The marvellous * *Durham Book* was such a work of art that after Cuthbert's death, in 698, the Bishop of Lindisfarne caused it to be encased in covers of gold, enriched with precious stones; and this care for fine manuscripts continued to be the practice up to the time when printing multiplied books and made them cheap. This was hardly to be called bookbinding, as we understand the term. The writings were fastened together and protected by wooden covers. Then goldsmiths, engravers, and jewellers were called in to beautify these rough covers with plates of gold, with enamels in various colours, and with crystals or even with precious stones.

Of course, in after times, especially in times of war, these books were seized for the sake of their covers; the books themselves being rudely torn away and cast aside as useless—one of the reasons why magnificent manuscripts became lost to the world.

By constant wear, as well as through constant pilfering, even the books which were not destroyed lost parts of their golden ornaments; and for that reason, when some pious possessor tried to repair the damage in later years, he added other ornaments quite differing in style from those used when the book received its first covers. Sometimes, indeed, on the same book there will be many additions that represent intervals of two or three hundred years. It is easy to detect these, because each age had its own *style* in ornament, and the restorer did not often try to add the missing portions in harmony with the parts which remained.

* See *Practical Teacher*, June 1910.

BOOK COVER MADE IN THE ELEVENTH OR TWELFTH CENTURY.

This is a beautiful example of the rich ornamentation that was lavished on the covers of old manuscripts. The centre figure of Christ, with the right hand raised in the act of blessing, is made of embossed gold—that is to say, the gold was raised from the back by means of small punches. In the left hand, and resting on His knee, Christ holds a book with an ornamented cover. The whole style is ancient in character, and recalls the illuminations dating from the eleventh century.* Around the figure runs an inscription in which the names of Matthew, Mark, Luke, and John can be read, and what looks like *Vox horum ovat* (whose voice exults). Other parts are broken, and the meaning is not clear.

From this it appears likely that this originally covered a copy of the Gospels. Plates of finely-embossed gold surround this central figure, together with eight other plates (two on each side) made of enamel, all the workmanship being exquisitely finished and finely designed. Included among this elaborate chased work are many crystals and precious stones, so that one may say the first makers of book covers were goldsmiths and jewellers, whose work gave the key to the principles which the later designers of bookbindings followed when leather took the place of these gorgeous coverings of ancient

* See the illumination (*Practical Teacher*, August 1910) similar in design.

manuscripts. Though it was not always the case, the general rule was to select some important figure to stand in the centre, and around this to build a rich framework which harmonised admirably with that figure; just as in later days, when kings and nobles collected printed books, the centre of the cover was frequently filled with a coat of arms or a monogram, which had a surrounding border of lines or stamped ornament.

Ancient books were not placed on their edge side by side as we place our books in a library. On the contrary, they were placed flat in cupboards, the most

early covers. In museums, many of the finest ivory carvings, containing dozens of delicate figures, are merely book covers, and they are generally pierced with holes showing where the fastening nails were driven from them into the wood. Cloth of gold, velvet, and satin were also frequently used; in fact, craftsmen in all the arts were called upon at times to display their skill in carrying out in various materials ornaments for the covers of choice manuscripts.

For less important works leather was freely used, and it is said on good authority that the stamped leather cases made in the twelfth century at Durham, Winchester,

Cover for an illuminated manuscript.
(This was probably made in the 11th–12th century.)

important, no doubt, having a separate compartment to themselves. When the book was thrown open, there would be considerable risk of injuring the delicate goldsmith's work; so that it early became the practice to place large bosses in the four corners raised a good deal above the level of the ornamented cover, an example of which may be seen in this present instance, where the four crystals at the corners project beyond every other part of the book. In later days heavy brass studs were very frequently fixed at the corners, to protect the fine coloured and "tooled" covers to printed books.

Gold and silver were not the only materials used for

and London (the chief centres for the production of written books) were the finest in the world. Many remain to this day: there was no gold to tempt the thief to destroy the books so humbly encased. Such books would no doubt be laid upon one another, as may be seen in the accompanying illuminated letter from a finely-written Bible of the fourteenth century. It will be seen, too, that the pages were often kept flat by means of clasps or other fastenings fixed on the covers.

Fine Bindings for Printed Books.

I have already pointed out that, when books came to be printed, the chief anxiety was to cast founts

of letters which should copy as closely as possible the handwriting of scribes. It is not surprising to find that the early bindings of printed books were ornamented in the same manner as the covers which protected fine manuscripts.

In speaking some months ago of Byzantine writing, I drew attention to the fact that Constantinople (Byzantium) was noted for its marvellous buildings, most gorgeously decorated, and that, as might have been expected, this delight in elaborate and rich ornament was quite naturally reflected in the manuscripts coming from that city in the eighth century. The reason is not far to seek. Byzantium stands at the gateway of the East. Persian and Indian work passed through the city on its way to Europe, and a love of ornament became natural to the artists who were settled in Byzantium.

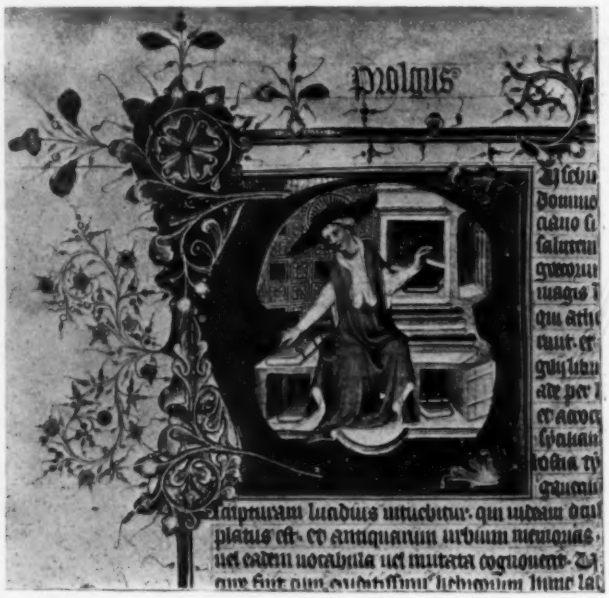
It was no doubt this delight that led to the making of such fine covers as the textus cover at the head of this paper. It will be seen at once that the designer was inspired by Byzantine art. It is even possible that the designer was himself a native of Constantinople.

And for brilliant manuscripts decorated with the most delicate and highly finished illuminations one has to turn to Persia and India, from which countries the early illuminators in Europe learnt so much. This exquisite taste and care for detail are quite as evident in the book covers from the East, and the early bookbinders in Italy turned naturally to Persia and India for their designs, or perhaps it would be better to say for the principles of their designs. The example printed below is a fine example of Oriental binding.

Jean Grolier and Aldus the Printer.

You will remember that in our last number mention was made of the italic lettering introduced in 1501 by the Venetian printer Aldus, who was a scholar as well as a craftsman. He had many rich patrons; he took the greatest care in printing fine editions; he employed Greek scholars from Constantinople to edit his books, and Greek bookbinders to cover and decorate them.

Among his patrons was one Jean Grolier, whose name is grateful to all lovers of books, not because he was an author, but because he was so whole-hearted in his delight in fine editions. In 1512 he was French ambassador in Venice, and later, in 1525, he lived in Milan. A cultivated man, what was more natural than that he should become a close friend of Aldus the scholarly printer, or that he should supply him with money to bring out choice books, beautifully bound? He had a library of three thousand volumes—an immense library when one considers that these were the early days of printing—and of these about three hundred and fifty are known to exist, for the most part carefully preserved in museums or in private collections—not preserved because of the books themselves, generally speaking, but because of their magnificent bindings, a "Grolier" being as expressive a term among collectors of books as a "Raphael" is to a collector of paintings.

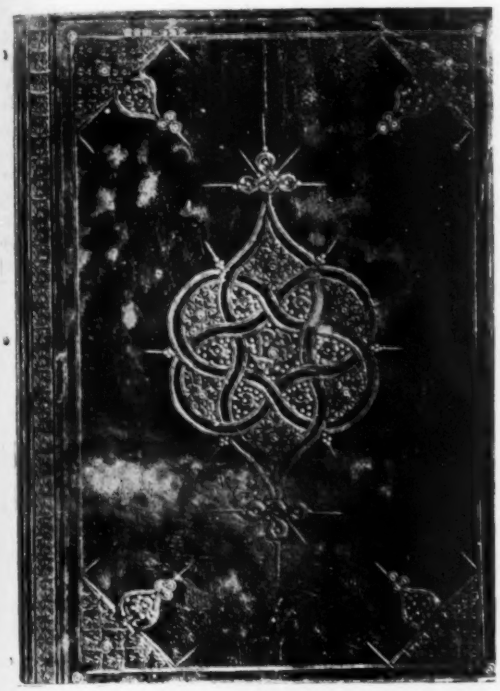


Initial letter from an English illuminated Bible of the 14th century, showing an early book-case with the books lying flat.

Grolier afterwards returned to France. From that day French bookbinding became the most notable in the world, and remained so for centuries. The natural taste of the Frenchman in what pertains to ornament had much to do with this; his pride in exquisite bookbinding has served as a spur to maintain the eminence he reached in Grolier's day, when Parisian and Lyonese bindings were world-famed.

For though there have been richer bindings than those which were common in France during the reigns of Francis I., Henry II., Henry III., Henry IV. (all of France), few, if any, can compare with them in fine taste; and modern craftsmen continually go back to

these beautiful works as to an inexhaustible mine from which to draw a wealth of design. No one knows the names of these clever artists, just as the world knows nothing of the astonishing craftsmen who wrote and illuminated early manuscripts; yet there is as much skill, knowledge, and taste in the designs as there is in many a painting jealously guarded in our galleries.



Oriental book-cover, showing interlaced bands in the ornament.
(Interlaced bands were afterwards common in Italian and French bindings.)

Grolier would have delighted Charles Lamb, who writes so enthusiastically of the "noble borrower," the man who seems to convey an honour upon the person he lays under tribute; for Grolier's habit was to have the words "*Jo. Grolierii et amicorum*" impressed at the foot of the binding to indicate that the book was the property "of Jean Grolier and his friends." What a collection Lamb's princely borrower would have made had he lived in Italy in the years 1512 to 1525!

"Tooling" in Bookbinding.

Before speaking further about Grolier's bindings, it is well to say something about the way in which leather covers were ornamented. Long before printing was invented, saddlers and other workers in leather had been accustomed to ornament their productions, such as harness and caskets, by means of metal dies, which, placed on the soft leather and struck by a hammer, left an impressed pattern. By combining these into patterns running into squares or other figures, a very satisfactory ornament could be obtained from a few simple dies. This was known as "blind" tooling, to distinguish it from the practice introduced into Italy during Grolier's stay at Venice—a practice which led to covering the die with gold-leaf, or impressing gold into the "blind" tooling.

It is evident that with half a dozen dies of different designs (flowers, leaves, twigs, stars, and so on) one could combine them in an infinite number of ways into patterns to fill a space, or to form a border round a space. Thus, if the face of a book cover was to be decorated, a cluster made up of a flower and two or three leaves could be impressed at the corners, and a border of stars could be made to run along the borders of the covers to meet these designs in the corners. Or the whole face of the covers might be stamped like a piece of printed calico.

That is the simplest way of decorating covers; and now that, as a rule, only the backs of expensively-bound books are tooled by hand, this same method is generally employed. Look at the tooling on the back of any such book, and you will see that only a very few tools have been used—a few sprigs or spirals or leaves—but these have been turned this way and that to form dainty patterns.

But in Grolier's bindings, as well as in all the finest examples after his day, the *faces* of the book were decorated. Here a few tools for stamping were sometimes used, but the greater portion of the space was decorated by the artist, who, first drawing a design in lines, introduced bands and loops in a marvellously clever manner.

Grolier's books are almost always decorated with interlacing bands, to which floral forms were added. As might have been expected, the Greek bookbinders employed by Aldus and Grolier had copied largely from Oriental designs, in which interlacing lines are very common; but this is of the least importance. What really distinguishes these artists is not their use of this or that method—whether they used bands or flowers or what not—but the really extraordinary taste that is evident in using such simple elements to build up such glorious designs. There was nothing "finnicking" in their handling; their stamps were often quite large and simple. In after years there came a craze for tiny tools, with which the whole cover was ornamented to such a degree that the leather is hardly to be seen. Sometimes, as in Henry the Third's reign (Henry III. of France), the royal books were stamped in patterns copied from the *lace* then so much in fashion.

Tastes differ; some ages have loved this elaborate ornamentation, but Grolier's bindings are generally admired for their beautiful spacing, delightful contrast of straight and curved lines, open free *drawing*, choice use of colour (for these bands were painted in blue and red). One feels, in looking at the early Aldine or Lyonese bindings, that a gifted artist had sat down with one of Grolier's morocco-bound books in his hand, and had looked upon it as a choice space to be filled in an artistic manner, with a design that should not have the appearance of being merely a happy accident, but one as carefully thought out in all its parts—its breadth of bands, size, and shape of central ornament, for instance—as if the artist were thinking out a fit decoration for an important building. It is difficult to express just what makes the difference between these fine designs and later ones, in which very much more gold has been used, and infinite patience shown in covering the ground with fine toolings. Perhaps it is that in these Italian and French bindings one recognises the trained artist as the designer, while in the later bindings the results point rather to a highly-skilled craftsman, gifted with

marvellous patience, but without that trained taste which comes from an artistic training side by side with a craft training.

In olden days the designer and the craftsman were often one and the same person. He learnt his design by continually copying the works of masters; and then, as was frequently the case, his own inborn taste led him to modify these designs in a very beautiful manner.

Two Early French Bindings.

Here are two examples of French binding wrought at Lyons in the sixteenth century. The rich interlacing of bands is the main feature of both. This strap-work was, of course, derived from Eastern countries; but it was eagerly seized upon by European designers, and was already so common in England by the time of James I. that "strap-work" is the particular mark of Jacobean design, appearing, as it does, not only on book covers, but in stone and wood carving, on buildings, furniture, jewellery—in fact, in all the arts.

Early French bookbindings, showing the interlaced bands copied from Oriental art.
(Grolier's bindings were often similar to these.)

This strap-work, especially when the bands are intertwisted, reminds one chiefly of Arabian work; and when it was used on book covers, in Grolier's days, the straps were usually associated with leaves and flowers taken directly from the East. In the book on the right in the reproduction, these curious leaf forms and flower forms are to be seen enclosed within bands, or springing from their edges, though it is only by courtesy they can be called flowers or leaves. The general name is *arabasques*, since the Arabs, forbidden by their religion to copy natural objects, were driven to invent forms that bear only the faintest likeness to anything living.

It will be seen that these arabesques are in outline. In early days they appear in three styles on book covers—solid, or in outline, or *azured* (that is to say, with lines drawn across them). Two azured leaves stand in the centre of the book on the left.

The Eastern maker of covers for fine manuscripts had varied his methods with much skill. Sometimes instead of using dies in which the pattern stands out boldly from the face, just as in the type used in printing the letter is raised, the Oriental workman *hollowed* his pattern in the metal. It is clear that when leather is stamped with tools in which the pattern projects, the *impressions* will be sunk below the surface; and this, in fact, is the almost universal plan in all countries. On the other hand, when the pattern is sunk into the die, the impression is reversed—the soft leather is squeezed into the die, and the pattern stands in relief.

The early bookbinder, still learning from the East, tried his hand at using these *intaglio* tools; moreover, when he was using punches on the surface of the covers on which he had used these intaglio tools, he drove the leather back in order to leave his lines projecting. The book on the right-hand side is a fine example of such work. Evidently (and especially when gilt was introduced) these projecting patterns, though very delightful in their play of light and shadow, were less suitable for books that were freely handled, as there was danger of rubbing down or chipping the leather, and the gold-leaf would soon be flaked. True, the brass bosses at the corners would do much to prevent injury, or even the heavy clasps would serve the same purpose, as they would be raised considerably above the surface. You may see where the clasps were fastened on the book in question.

The Possible Connection of "Tooling" with Early Printing.

An interesting light on the origin of printing is shown by considering the practice of the early saddlers and makers of handsome leathern caskets. It was pointed out above that these craftsmen were in the habit of ornamenting their work by means of well-cut metal dies, by means of which they stamped patterns on the leather. These patterns were cut into the metal.

I do not know that any examples exist, but it may readily be seen that the die-cutter, in order to *prove* his design—that is to say, in order to see whether the outlines were clear—may have resorted to the common expedient of smearing the die with colour or thick ink, and taking from it an impression on paper. Goldsmiths, too, used dies to ornament their work, and it is quite probable that they too would prove their dies in the same way, or perhaps by impressing them on wax.

At any rate, die-cutting was an ancient art that had reached a high state of delicacy long before printing was invented. And one remembers, too, how the first printer, Gutenberg, was assisted by the goldsmith Fust, who most likely not only supplied money, but cut the punches or dies (which in this case consisted of letters) for the making of type. We know that the practice

was to take such punches, and, by striking them sharply with a hammer upon lead, to make a *mould*, into which the molten metal was poured to form type. The very excellence of Gutenberg's first printing shows that the die-cutter of his types (or typefounder) was an extremely able man, since on that score alone can we account for the regularity of the earliest types.

Space forbids more than a mention of the splendid bindings in which for two hundred years Italian, and especially French, royal books were encased. Names of collectors and binders of exceptional merit stand out sharply: De Thou and Le Gascon are two of these, but there were many others whose names are forgotten. Royal book-collectors, such as Henry II., Henry III., Henry IV., together with Catherine de Medici (with her library of four thousand volumes), encouraged the art of binding, so that any books with their princely coat of arms or monograms are eagerly bought up whenever they appear.

In a more extended article it would be interesting, too, to point out how the designers copied designs for lace, or ironwork, or stained glass, or wood-carving as grounds for book covers; and the use of embroidery and painting would naturally be mentioned. Then, again, the insides of the covers had their separate designs; and even, in later years, it was not uncommon to paint pictures on the edges of the closed book. To-day we have remains of this in the practice of gilding the top edge of the close book, or sometimes in "marbling" the sides.

Thus the precious book was not merely beautifully printed, but every part of the outside was decorated. The covers were stamped and painted, pierced gold and silver were sometimes used, and even the clasps were things of beauty; and, moreover, the edges of the book itself, quite apart from the covers, were delicately painted with figures or landscapes. Truly, few things have been more lovingly decked than that most precious of man's possessions—the book.

SIMPLE LEATHER-WORK FOR SCHOOLS.

BY AGNES E. FARMAN.

A Leather Bag.

INSTRUCTIONS as to leather and materials are given in last September number.

This is a more difficult exercise than either of the preceding ones, and it is helpful for the class to construct the bag first in brown paper.

The pattern is ruled, as usual, on the back of the skin, and the parts are cut out. The dimensions of these are given in the diagrams on page 690.

The suspending strap C is laid in the middle of the front piece A, so that the top edges FG and HJ coincide. Holes should be punched as in Fig. 1, and also two holes

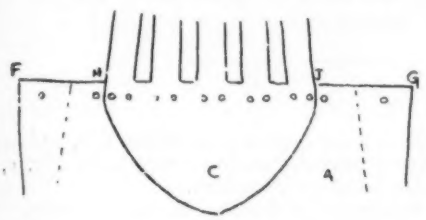


Fig. 1.

in the back piece B (Fig. 2) to correspond with the two outer ones in A.

Next, the front and back pieces are laid together with the outsides facing each other, and the side edges

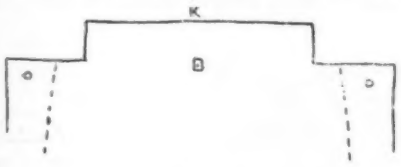


Fig. 2.

are strongly overcast on the wrong side with the sewing silk. The bag is then turned inside out, so that the outside of the leather is in its proper place, and the holes along the bottom are punched about ¼ inch apart, and threaded with a leather thong (Fig. 3). If necessary, the positions for the holes may be marked with ink. The thong is finished off with the ends inside, and these should be safely sewn together with silk.

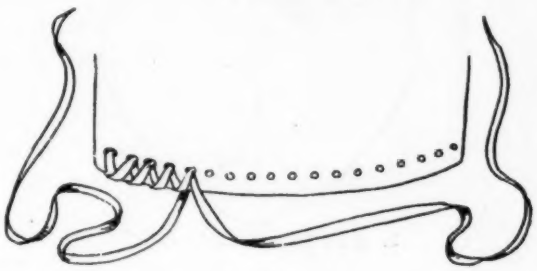


Fig. 3.

Next, the suspending strap is laid in its place once more, as in Fig. 1, and threaded as in Fig. 4, being fastened off as before with the silk at the back. The two covering pieces, D and E, are now laid in position, one on the front over the suspending strap, and the other immediately under it at the back. The top edges of both should coincide with the edge K of the back

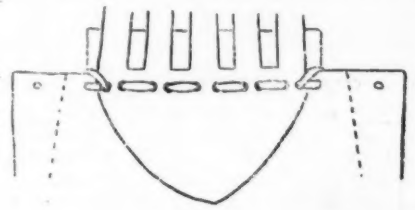
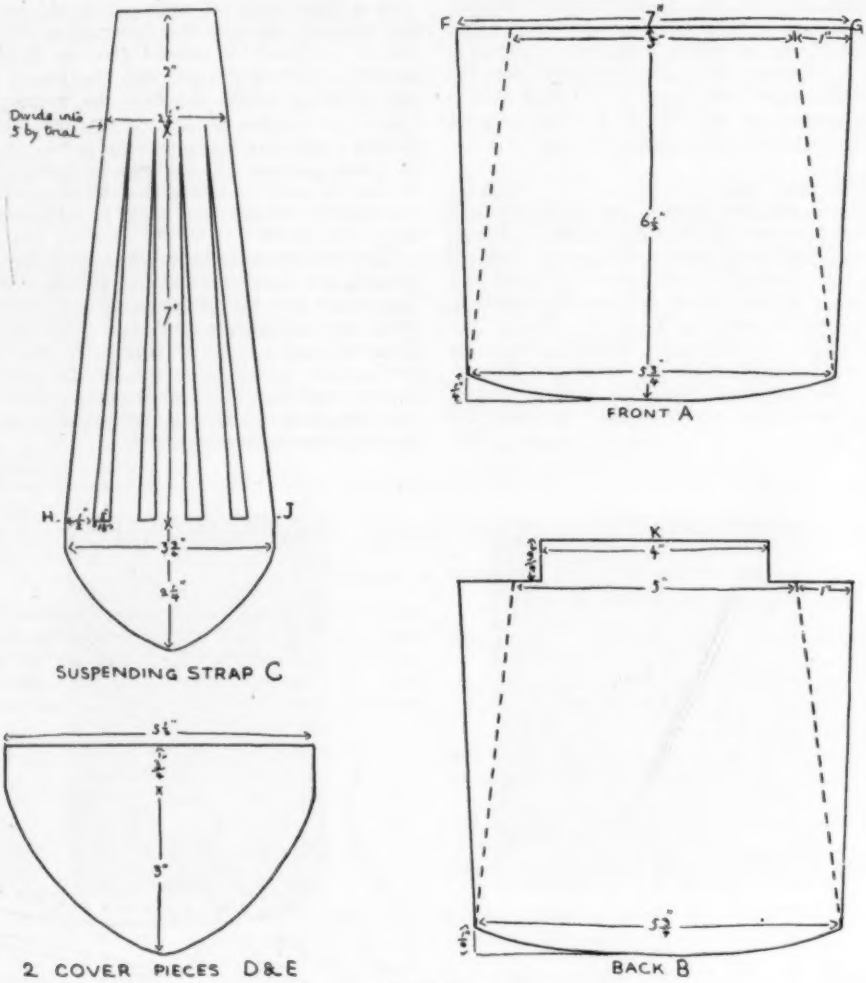


Fig. 4.

piece of the bag. Holes are punched through the three thicknesses of leather between the divisions of the suspending strap, and through the two thicknesses at each



Diagrams.

end (Fig. 5). Great care must be taken that the punch escapes the straps. The holes are threaded with thongs, as shown in the finished bag, the ends being sewn together at the back.

The gusset must now be folded inwards, on the lines suggested by the dots in the diagrams; and in order that it may be held in its place, a strip of leather about 4 inches long is threaded through the two holes already punched on either side, and passed round the second suspending strap, as in Fig. 6, the ends again being sewn together.

The top may be finished in various ways. If a metalwork class is available, a hook can easily be made in copper, with a wide face and pierced holes, to which the top end of the suspending strap may be attached by threading the two with a strip of leather (Fig. 7).

Another way is to pass the end of the strap through a long link of strong copper wire, to which a chain is

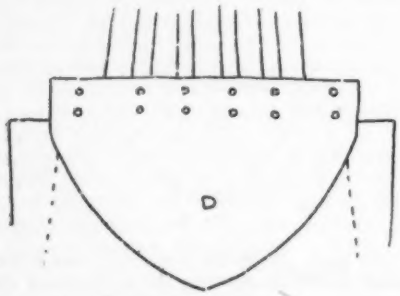


Fig. 5.

Fig. 6.

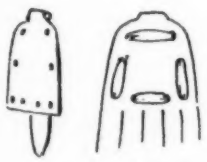


Fig. 7

attached, as in drawing of completed bag. If nothing of this kind is obtainable, a brass curtain-ring serves every purpose (Fig. 8). The two last methods need a waist-hook to which to suspend the bag, and these can be purchased at most fancy drapers.

FIG. 8.

The bag when in use is opened by lifting up the cover piece D with one hand, and pulling down the lap of the suspending strap C with the other. The hand is inserted between the straps, which are now quite loose.

Fig. 9 shows the bag when completed. It may be varied both in shape and construction, according to the individual fancy of the worker, or a pattern may be tooled on the front; but as a rule the thonging will be found to be sufficient ornament, the workmanship and materials giving character to the whole, whilst preserving the simplicity of the design.

Other articles suitable for such elementary leather work as the above are a purse and a serviette ring, and others will no doubt suggest themselves to the teacher and pupils as the work progresses. Variety may be obtained by using thongs of a different coloured leather, but great care is needed to blend the two harmoniously.

Craft work of this kind is a great incentive to drawing. The realism and utility appeal to the pupils, and provide an excellent means of expressing concrete artistic ideas.

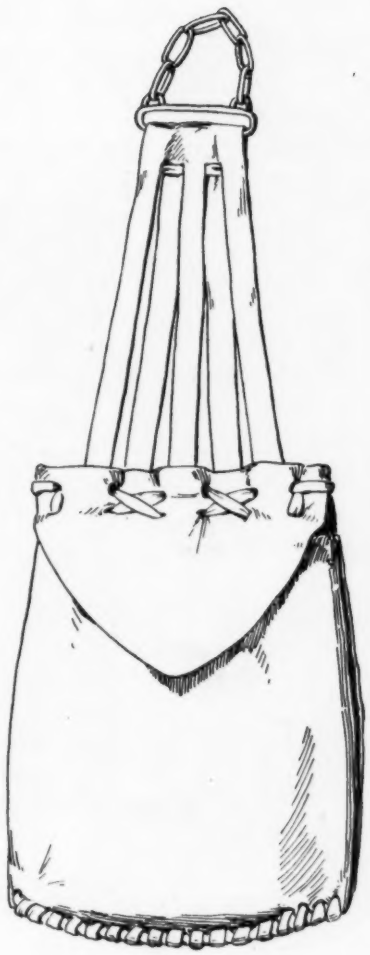


FIG. 9.

ART IN THE MANUAL TRAINING ROOM.

SUGGESTIVE MODELS.—II. A FLOWER VASE IN TEAK.

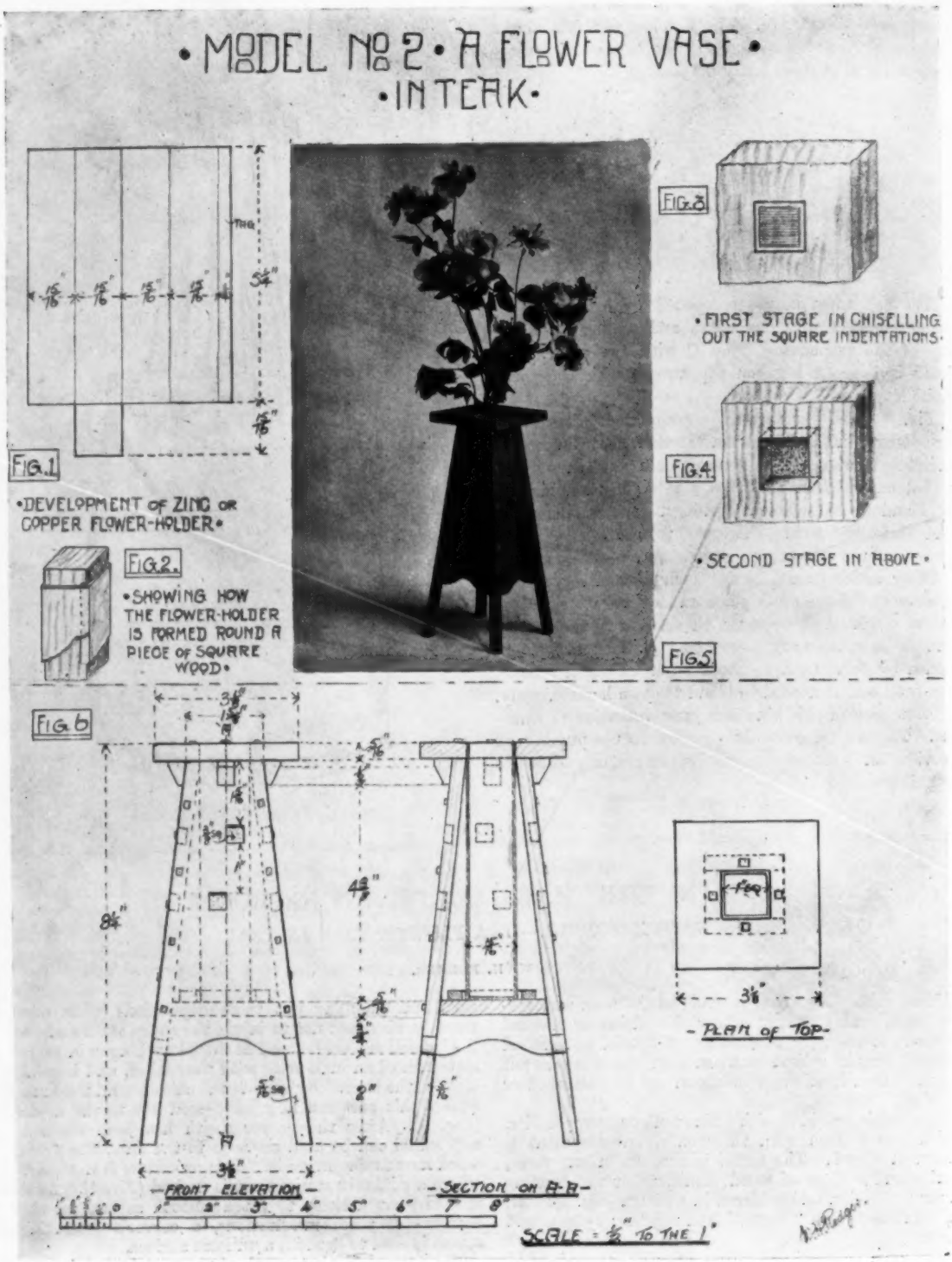
BY W. H. RODGER.

THIS little flower-vase is made of $\frac{5}{16}$" teak throughout, and is meant either for dried or natural flowers. If used for the former, it should be finished *natural*, for the reason mentioned in No. 1 model; if for the latter, it might with advantage be varnished or polished.

The vase is provided with a zinc tank or flower-holder, which comes flush with the top. A development is shown in Fig. 1. The metal is cut out in one piece, bent round a piece of wood planed to fit the opening in the top easily, and soldered in position (Fig. 2). All the joints are plain "butts," held together by glue and screws.

The main decorative features are the square-headed screws—the preparation of which was explained in last month's model—and the $\frac{3}{8}$" square indentations on each side. In chiselling out these depressions great care must be exercised not to injure the sharp square edges. A $\frac{1}{4}$" chisel should be used at first, knocking it in every sixteenth of an inch or so with the mallet, and keeping clear of the lines. By sinking the chisel round the inner square this part can now be cleared out to the depth (Fig. 3). After the proper depth has been reached, a $\frac{3}{8}$" chisel can be used right up to the lines, the waste wood now falling inwards. This procedure is necessary where a perfectly straight cut is desired (Fig. 4). As it is somewhat difficult to get a smooth surface on the bottoms of these indentations, a carver's grounding stamp is used to produce a uniform surface.

Fig. 5 shows a photograph of the model when in use, and Fig. 6 gives all the necessary details of construction for the making of the model.



ART IN THE MANUAL TRAINING ROOM.

THE HISTORY LESSON AND DRAWING.

ARCHITECTURE.—II.

BY W. H. ELGAR.

SOME years since there appeared in the *Practical Teacher's Art Monthly* a series of papers on "Architecture for Teachers." These were simply, as their title indicated, written for teachers, and gave some idea of the essentials of architecture as exemplified by our native styles, and some hints as to practical methods of study. The present paper will discuss simple applications of those methods, as well as some further and still simpler ones.

When studying detail there is always the likelihood of losing the idea of its relation to the building of which it forms a part. To prevent this, it is always best to make even the slightest sketch of the whole building,

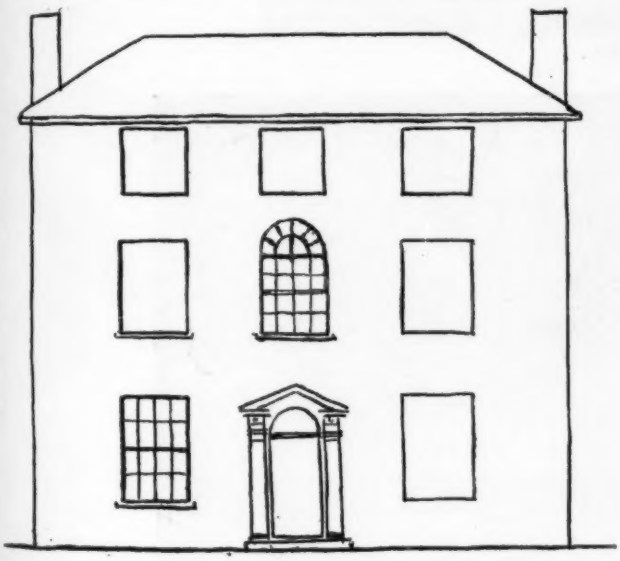


FIG. 1.

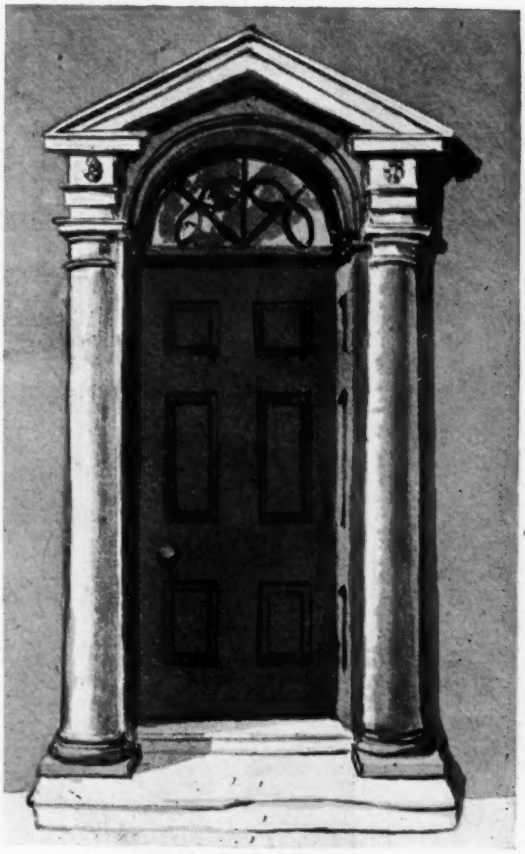


FIG. 2.

or section of the building, marking plainly where the feature occurs. A sketch of this character is Fig. 1, showing the front of the Georgian house which boasts of the interesting doorway (Fig. 2). Perhaps it is best to refer to this at once. Georgian houses are very often symmetrical in elevation, the door being in the middle, and one or more windows on either side of it; and the windows of the upper stories corresponding, the one over the door often being of some other shape—round or round-headed—while the others are rectangular. The walls run straight up, there being no overhang as in former periods, and the different floors are often marked by some slightly projecting courses of brickwork. In most cases the joinery of windows, doors, staircases, and cupboards is very good and very interesting, being made by hand. The details, of course, are inspired by Renaissance ideas. Our doorway shows two three-quarter columns of the Doric order under two fragmentary entablatures which support a pediment. Under the pediment is seen the fanlight, with fancifully shaped divisions, and the substantial six-panelled door, which is flanked by similarly panelled jamb-linings. This is given because it is a type of many that are

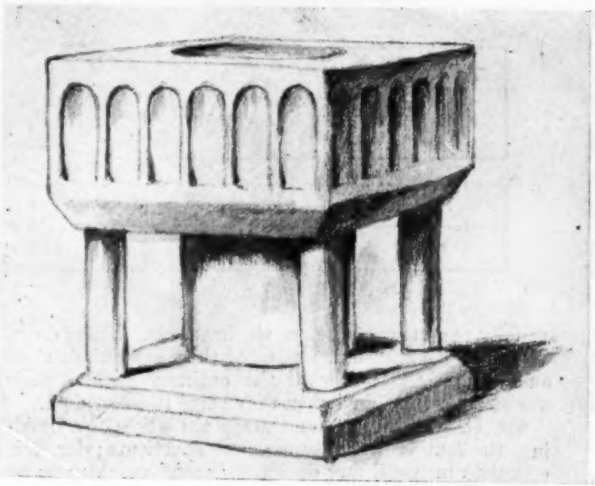


FIG. 3.

Fig. 4.

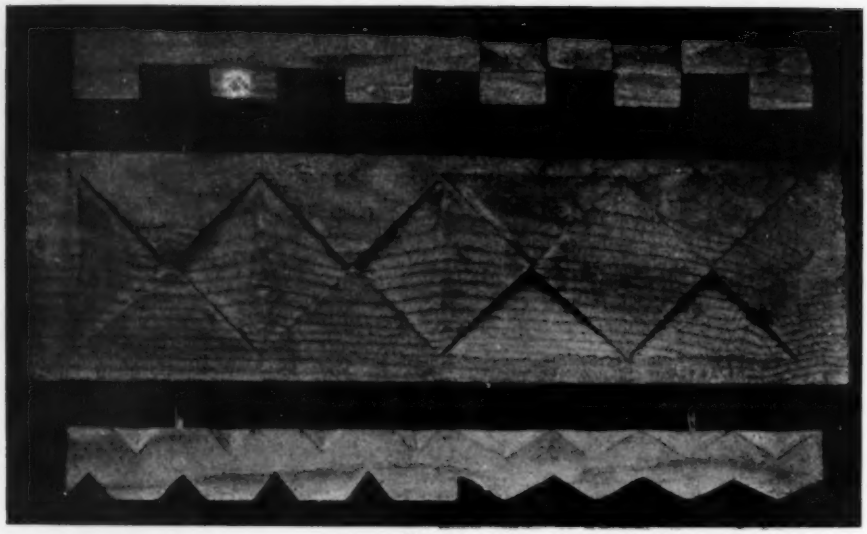


Fig. 5.

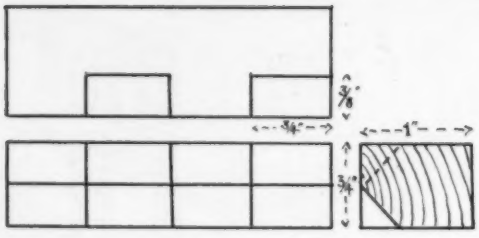


Fig. 6.

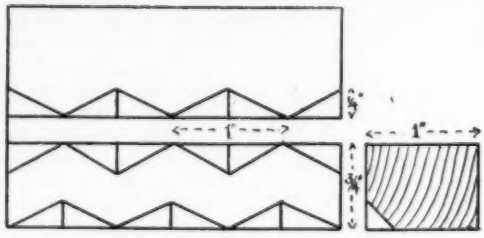


Fig. 7.

rapidly passing away before the improver. These doors are all worth sketching; many of them are quite simple and within the power of the ordinary pupil. Their variety is astonishing when they come to be studied.

For children, who cannot grasp the whole of a building, the font is probably the best substitute; for it is complete in itself, and does not depend much upon its surroundings. Early fonts are often very plain, Fig. 3 being a type very widely distributed over our country. This consists of a rectangular block of stone, having its sides cut into a series of panels, its lower edges chamfered, and a hemispherical depression in the top. This block is supported by one large and four small plain cylinders, which rest upon a slab of stone, with its upper edges chamfered. Many variations of this simple arrangement occur, some even without the panels, and

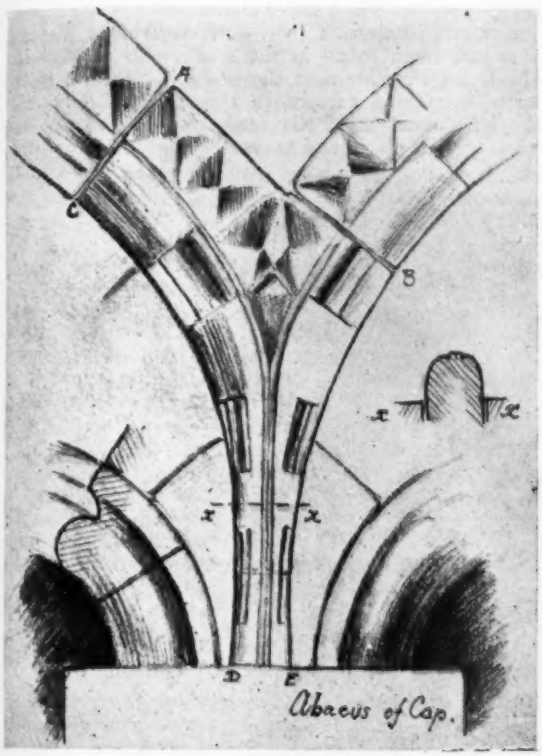


FIG. 8.

some with a general slope to the sides instead of the chamfered edges. All make admirable simple modelling exercises, which should be done to scale to be of any real use. This neglect of scale seems to be the most serious fault with much of our school claywork.

A peculiar variety of this type is the font at Tintagel Church, Cornwall (Fig. 4). Here it will be seen that the angular supports stride out considerably, are octagonal instead of cylindrical, and have simple bases; the bowl has faces carved at its angles, and snakes loop the heads to one another. This photograph is from a clay model made to the scale of one inch to a foot. The model rests upon a square of wood, and is held firm by five large wire nails, one in the centre and one up each sloping support.

Some of our woodwork courses seem to neglect the chisel somewhat. This is rather to be regretted, as a command over that tool is a good preparation for wood-carving. Then generally the exercises which depend largely upon the chisel are among the least interesting. The photograph, Fig. 5, shows some simple Norman mouldings cut in wood with ordinary firmer chisels. The dimensions of the upper and lower examples will be seen from the scale drawings, Figs. 6 and 7. Quite a different effect, it will be seen, is obtained by cutting the diamond-shaped moulding in the centre of the photograph in different ways.

In taking sketches from buildings for such work, considerable differences will be found in the sizes of the details (see Fig. 8): the lines within which the moulding runs are generally equidistant, but the widths of the various units are governed by the sizes of the stones, each stone containing a number of complete units. Perhaps the best way is to measure a number and take the average.

Nothing but good can come from making such sketches as Fig. 8, which shows the way in which two similar mouldings are blended on one stone, ABCDE. The gradual diminution of the round billet moulding down to DE on the abacus of the capital is most ingenious, the full projection being preserved all the time (see section xx). This sketch is from the well-known interlacing arcade which ornaments the outer walls of much of the eastern transepts of Canterbury Cathedral. Of course such a sketch should be accompanied by a rough idea of at least one complete arch of the arcade, just as

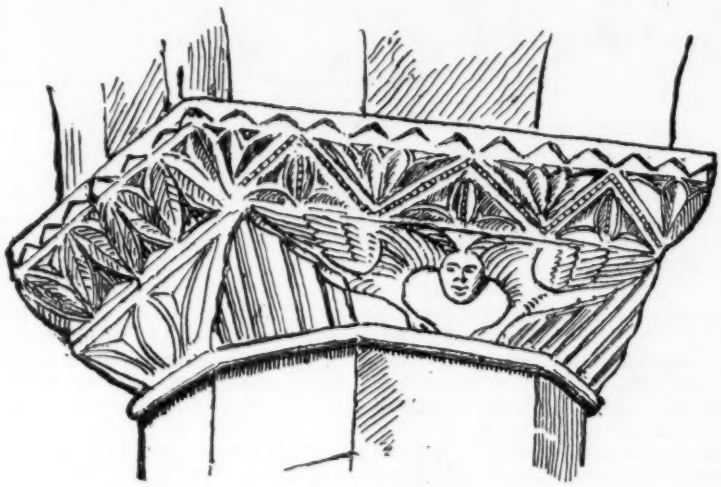


FIG. 9.

Fig. 1 indicates the position of the doorway (Fig. 2). Space only has prevented this being supplied as well as one to accompany Fig. 9. This capital does the work of transferring the weight of two plain arches, which

impose a square of masonry on to its top, to the octagonal pier beneath it. The change in its form is cleverly, if roughly, accomplished. If this problem be attempted with clay, a small block of wood, or even a piece of soap, it will be discovered that it is not so easy as it looks. The pupil will soon discover that it is essential to mark out the octagonal and square forms very carefully before beginning to cut. A simple exercise of this nature is much more valuable than it at first appears, forming a wholesome corrective to the carelessness arising from the ease with which models in clay can be modified. Then such work is the exact counterpart of much of the modelling on the add-a-bit idea, being a kind of subtract-a-bit, which cannot be put back.

The shallow carving shown in our sketch is included to show how cleverly the Normans adapted their ornaments to almost any shaped surface. Such work can be easily suggested by simply scratching the surface of some soft material with a hard point. Possibly we shall find opportunities when manual work is extended and made more generous and catholic to include some simple exercises which foster glyptic ideas.

Our last illustration (Fig. 10) represents a piscina, a feature often found in the south walls of chancels of our old churches near the east end. Such a niche forms a splendid exercise in the study of light and shade for older pupils, who often are doubly interested when told the object and use of such features.

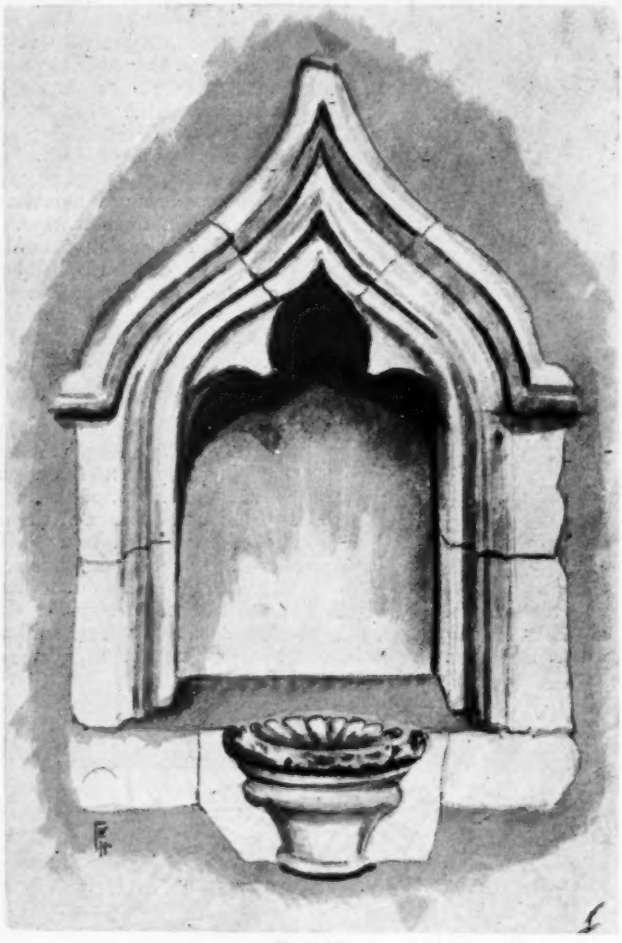


Fig. 10.

This subject is perhaps the widest of all those treated under our heading of "The History Lesson and Drawing," and the most important, a knowledge of the styles being almost essential to the student of history, and of great advantage to the artist. How interesting to be able to tell not only the ages of the various parts of a church, but to read the history of a town in its houses!

However, this is certain, that any one who once begins the serious study of architecture never regrets or leaves it entirely. Attention will create interest, and interest will deepen into a lifelong affection for our history in brick and stone.

EDUCATIONAL HANDWORK—SOME HOPES AND FEARS.

BY H. HOLMAN, ESQ., M.A.

THE annual meeting of the Educational Handwork Association (London Branch) was held recently at the rooms of the Royal Society of Arts. The retiring president, Dr. C. Kimmins, M.A., took the chair, and briefly introduced the new president, H. Holman, Esq., M.A., who selected as the subject of his presidential address, "Educational Handwork: Some Hopes and Fears."

Life began and continued, remarked the lecturer, with hopes and fears, and a very real fear was with them that afternoon, for they had sustained a very serious loss in the retirement of Dr. Kimmins from the presidency of their Association. Speaking for himself, as the newly-elected president, he would promise to do his very best to further the interests of the Association, and to ensure its continued success; but to the members present he could at present only tender the well-known advice to "wait and see."

With regard to the hopes and fears in the general outlook, he thought at the present moment there was every reason to feel hopeful. People were talking about handwork as a means of education, not always wisely or with knowledge, but they were getting more and more alive to its possibilities. The most important official document on the subject was, of course, the recently-issued Board of Education report on "Handwork in Elementary Schools." Second to this in public importance was the long-delayed report of the London County Council Conference on Handwork, which they hoped to see published very soon. In studying the Board of Education report, he found some very good suggestions, but they were so mixed up with bad ones that it required a great deal of sifting to get at the good points.

One satisfactory thing he noticed was that the subject was evidently troubling the official mind, and he hoped that this report would really lead to something definite and practical in the direction of instruction in handwork throughout the country.

One of the fears which he had was caused by noticing that the report was vitiated throughout by the attitude taken up by the writers, who seemed to treat handwork as merely a method of instruction, and as a sort of handmaid to general school work. That view, in his opinion, was a vicious one, and this was an issue which they as an association would have to face. The important question was, whether handwork was to be made a subject of instruction, or whether it was to be regarded as a method of assisting the ordinary work of the school. He noticed also that the writers of the report recommended the retention of special grants for certain specified subjects of handicraft. He would greatly prefer to see a fixed grant for all schools. This point, he considered, was a bad element in the general situation.

Then, again, the spirit of industrialism cropped up again and again in the report. At the age of ten or eleven it was recommended that the handwork should be "more industrial" in character. They ought to nip that idea in the bud, or evil days were ahead of them. If this idea grew, who could foretell how far it would be carried? We should have pottery taught here, ironwork there, and agriculture somewhere else—the teaching of industrial occupation instead of educational handwork. He did not know whether, in suiting handwork to the needs of the various districts, we may not have a proposal to teach the picking of pockets in the East End, for this was certainly a highly-developed form of handwork. Industrial teaching was tried fifty years ago on the subject of agriculture, and failed utterly; then the teaching of political economy was advocated, and started in the elementary school. This also failed, and for the same reason. The fact was the child should not be taught to imitate the man; the child must be regarded as a child.

There were several non-educational hints thrown out in the report on the subject of gardening, and what was termed home-making came also under the head of manual training. There were very vague and elusive ideas respecting handwork running through the report. Of course the tying of boot-laces was handwork, so was the blowing of noses; but there was no educational training in these accomplishments. In his opinion, it was a mistake to attempt to make little girls into little mothers. When the proper time came, then experiment educationally in this matter, but not with little children.

Then, again, in the report the writers speak of emulation as a means of bringing the slow and timid children up to the general level. This was a pernicious idea—just payment by results again—the old percentage nonsense cropping up once more. The slow children brought up to the average! Why? Surely it would be better to treat slow children as slow, and the quick ones as quick, and not vainly strive for the dead level of general uniformity in education. But there was evidently a striving after the latest ideas in education by those who didn't quite know or could not entirely sympathise with them.

It always would be so until there was a root-and-branch reform of the Board of Education. There were, he knew (and he spoke with an inside knowledge of the subject), many able men in the Education Department. Many good things were started by them. They couldn't help moving with the times—sometimes. But the Board of Education damned the expert—the man who made a special study of educational reforms—and thought it better to consult the man in the street for improvements in our educational system.

Dealing with the present outlook in the schools, he thought that, on the whole, it was a good thing to place the manual training department under the headmaster, so that the work there was not detached in ideals and working from the rest of the school. Undoubtedly the manual training teacher should take his place as one of the regular staff of the school, and not be looked upon as an outsider or inferior to the rest of the teachers. There was now, he thought, a chance that the principle underlying handwork would leaven the whole system of school education. Of course there was always the fear that an aggressive and uninformed head-teacher would interfere with the manual training teacher. He hoped that this would not be so; but he could not conceal the fact that some head-teachers looked upon handwork as an interesting sort of amusement, but not as in any sense real education. Thus they had a mild contempt for the whole thing. He, the lecturer, was sure that in the infant school we had the beginning of

a real education. He thought that to look at handwork as a *method* of instruction only was a very serious mistake. It is true we might often with advantage make things for the sake of illustrating other school lessons. But this was not handwork in any serious sense. He thought that where this idea had taken root the result was wasteful and disgraceful—wasteful, because they were always doing little things crudely and incompletely; they were always at the beginning of things—always attempting new things, and never acquiring skill in anything. This was the result of the prevalence of the pernicious idea that handwork was merely the *handmaid* to other school subjects. In his opinion, handwork meant the acquisition and development of skill. There was nothing more important than the proper development of skill. If you got rid of skill, you got rid of the idea of development.

Why not include the digging of school drains, and ally it to gardening? There would then be the correlation so much advocated in these days. And who knew that by-and-by we might so develop these ideas that we might make each school a self-supporting industrial school.

In the discussion which followed the lecture, it was clear that the audience were not by any means agreed as to the point of view which it was best to take of the proposed introduction of handwork into schools. Some teachers present plainly advocated the industrial bias which the lecturer had so emphatically condemned. Others thought that a compromise was possible, and suggested that handwork should be regarded as a *method of instruction* in the lower classes, and as a distinct *subject of instruction*, with a suitable industrial tendency, in the upper part of the school.

One head-teacher said that he had requisitioned a supply of buttons, needles, and thread, so that he might teach his poor boys to sew on these indispensable articles, thus making handwork of very real use to them.

It was altogether a very animated and suggestive discussion, which at least showed that there were two sides to the question, and indicated the difficulties surrounding the introduction of educational handwork in elementary schools.

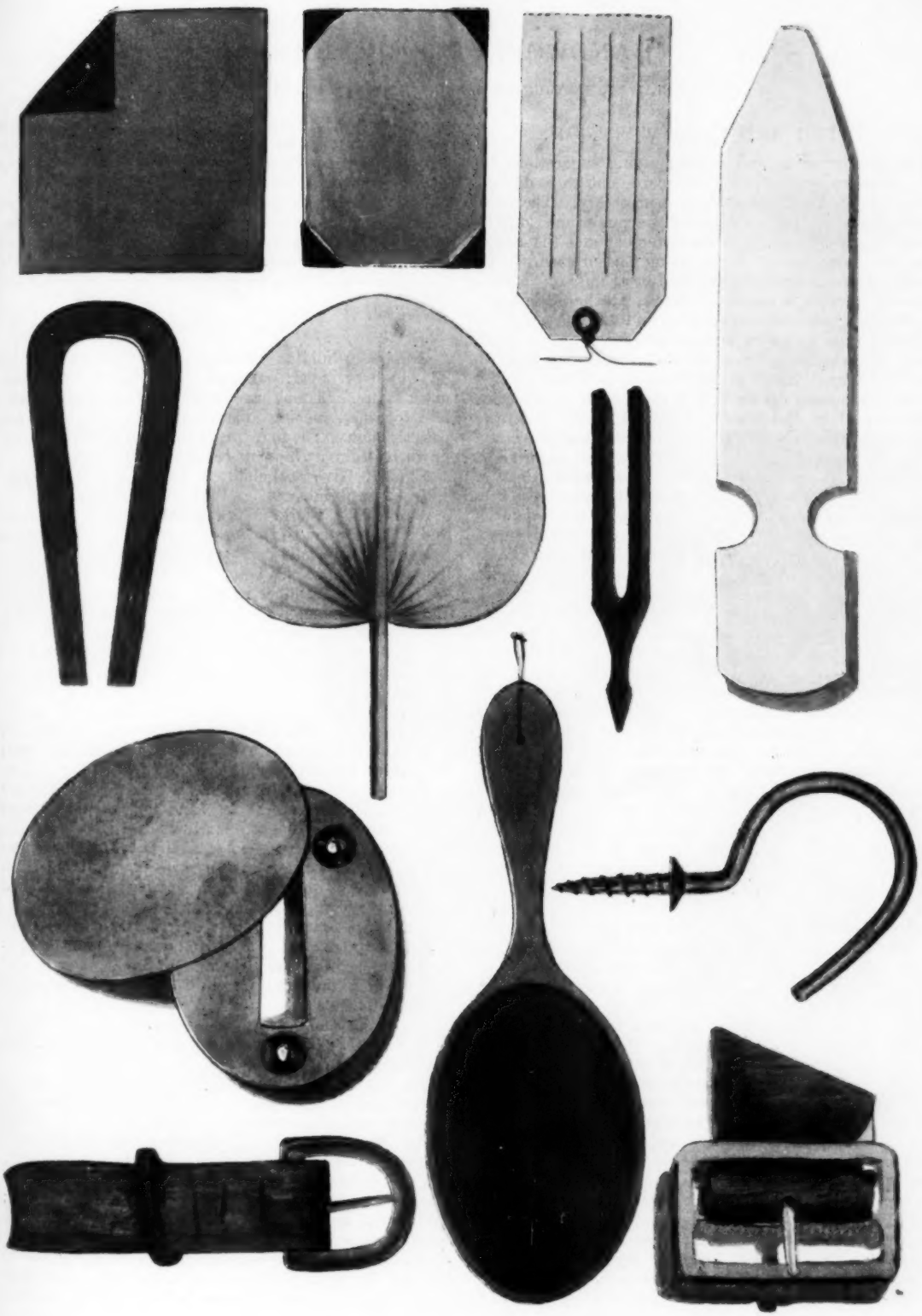
SOME SUGGESTIONS FOR THE JUNIOR CLASSES.

THE old conventional style of drawing in bare outline is rapidly passing away, and giving place to a more realistic representation. This is a great gain in every way. It satisfies the child's natural inclination, and gives, when carefully and systematically taught, a far more complete conception of the object. Hitherto the use of colour has been mainly confined to "brush drawing;" and brush drawing has been somewhat limited in its outlook, consisting for the most part of typical brush strokes and the representation of natural forms and patterns derived from both these sources. There is nothing wrong about this; but the object of the present short article is to suggest that the brush may also be used in making the complete representation of common objects.

The illustrations given on page 699 are only suggestive; they may be multiplied by the score. They range from a simple square of coloured kindergarten paper, with one corner turned down, and which is a suitable exercise for Standard I. children, to the buckles and mirror which are difficult enough for the best scholars of Standard III.

It should be noted that this is not "painting" in its true sense. The outline is always very carefully drawn first, for "form" is most important. In some cases a little tone—inherent in the thing itself, as the corners of the blotting-pad and the bottom of the magnet; or the cast shadow, as in the plant label, the magnet, the escutcheon; or the very simplest light and shade, as in the buckles—is put in. The colour of the object is then added. This colour is not conventional. It should be as nearly as possible the actual hue of the object. For this reason, in the earlier exercises, examples having simple flat tints should be selected—luggage labels, envelopes, and such like. There need be, then, no convention about the colour; a simple flat wash is all that the representation demands. It adds very little to the difficulty, but greatly to the appearance of the drawing, and to its realism. Colour is also so useful in suggesting the material of which the object is made.

A drawing scheme of the present day need not, therefore, be divided into "drawing" and "brush drawing." A selection of natural and common objects should be made, suitable for the class as far as form and colour are concerned, and carefully graduated. They are then represented in the manner best adapted to them. For example, leaf forms may be drawn in pure outline with the pencil, such drawings showing the details of stem, veins, and serrations; or direct with the brush, in full, strong colour, the object being to represent the mass. Some objects need only black and white, such as a black-edged envelope, a domino, etc.; while others demand colour, and perhaps a little pencil shading, as in several of the illustrations. The latter should be confined to small spaces at this stage. The hard point of the pencil is not a good medium for covering large surfaces. The larger objects—such as the palm leaf fan, plant label, and mirror—are suitable as class exercises; but the smaller examples—such as the tuning-fork, magnet, luggage label, buckle, etc.—can only adequately be seen by two scholars at the same time. There is, however, no reason why all the children should be drawing the same object at every lesson. It is an excellent thing to throw them on their own resources sometimes. If this plan were adopted, there would be no separation between the various forms of drawing, nor any different outlook on pencil and brush work. All the drawing work of the school would form a complete whole. These illustrations, too, may be suggestive for junior work for the "Honours Page."



SUGGESTIONS FOR THE JUNIOR CLASSES.

HANDWORK FOR JUNIORS.

BY H. WAY, INSTRUCTOR SCARBOROUGH SUMMER SCHOOL.

PAPER AND CARD WORK.—III.

IN the preceding and accompanying suggestions for practical work, paper and card, cut to a definite size, prepared by the teacher, is necessary. The work aims at cultivating an increasing acquaintance on the part of the children with measurement and the use of the ruler and pencil. By applying measurement to the production of definite objects, and by the use of coloured papers, interest is sustained, while, at the same time, in handling squares, rectangles, and triangles, unconsciously these forms are being impressed upon the mind. It is not necessary nor advisable to teach these forms in the abstract before giving them to be experimented upon. A square drawn in a book is quite an abstract idea to a child, and drawing a square or oblong by the aid of the ruler alone is a waste of time, and the cause of much vexation in endeavouring to secure a true right angle. What grown-up person would waste time in constructing a square, which he wanted exact, by the aid of a ruler alone? The point of the lesson would be entirely missed if the children had to draw their own squares, rectangles, etc. For such reasons it is recommended that the shapes to be experimented upon should be given to the children prepared at this stage.

When facility in the use of ruler and pencil has been secured, introduce the set-square, which should be of thin light wood, and *small*. Here is a new instrument with three angles, one of them larger than either of the others. Let the children fit this large angle into all the right angles which can be suggested—the corner of the book, a picture-frame, a pane of glass. By so doing the pupils will observe that this instrument can be used in obtaining the particular arrangement of two lines which we call a right angle. Draw right angles by the aid of the set-square. Next instruct the children in the best way of using the set-square. With the ruler draw an upright line, mark a point on the line, place the ruler against the line, lay the set-square against the ruler, keep the ruler firm with the left hand, and slide the set-square up the ruler to the point; hold the ruler and square with the left hand; put the point of the pencil in the mark: if the set-square touches the pencil, draw the line. Practise drawing right angles in this manner with horizontal and oblique lines; *always use the ruler and set-square together*. Having now some idea of the right angle, let the children discover the properties of a square. The lesson may proceed on these lines. Each child is supplied with a square of thin paper. By folding corner to corner it will be seen that the opposite corners are equal and the adjacent sides are equal; by folding edge to edge it will be seen that the adjacent angles are equal, and the opposite sides—that is, the four sides—are equal and the four angles are equal. Now let the pupils fit the angle of the set-square into the corners, and they will see that the angles are right angles. Thus they will learn that a square has four equal sides and four right angles. Instead of following with the usual square drawn in a book, give the children a piece of *irregularly torn paper*, no side straight, and let them construct a square without any help from the teacher. Cut it out, and fold it as the original square was treated. *The many failures will do more towards teaching the properties of a square than hundreds of squares drawn in a book.* An oblong may be treated in the same way.

Next proceed to construct and cut out a square, an oblong, of definite size, and turn it into an interesting object. These objects should become the property of the children who made them. Further exercises in the manipulation of the set-square will be given in the next article.

PRACTICAL WORK.

Fig. 16. A folding exercise. Give the children an 8″ square of paper, coloured. Fold as in illustration, mark figure, cut out shape, cut along lines shown white, fold together, placing arrow-head corners in slits, and pass through. The four corner squares should be tucked in when folding. A small sweet box is the result.

Fig. 17. Give the children an equilateral triangle, cut out in bright-coloured paper, length of side 8″. Measure sides, mark middle point of each side, draw lines from corners to these points (the lines should cross at one point). Mark a certain distance down these lines, cut down to this point, and turn into a windmill.

Fig. 18. A key label in thin tinted card. Give the children an oblong 4″ by 1½″. Mark distances as shown, draw the figure, and cut out. By putting pressure on the pencil make a deep line at the point *a*, bend the end over with the line inside, pierce a hole, and put the string through.

Fig. 19. A windmill. Give the children an 8″ square of tinted card. Mark out as shown; then let them cut a 5½″ square of paper into four by drawing the diameters; stick these squares on as shown.

Fig. 20. Give children a rectangle of brown paper 8¼″ by 7½″. Mark points 5½″ from each corner of base; join; mark as in diagram, and cut out. The object is intended for a picture postcard holder. Slits can be cut to put the corners of the card in, or the card can be stuck on at the corners, the children being allowed to judge the distances from the edges.

Fig. 21. A small pin-tray. Give the children a 6″ square of tinted card. Measure distances, and mark as in diagram. Make deep folding lines with pencil, and fold up with lines inside as in 21*a*; fasten with midget paper-fasteners.

Fig. 22. A small tray with sloping sides. Proceed as in Fig. 21. Pierce holes in corners, and fasten with string or ribbon.

Fig. 23. A book-cover in brown paper. Mark out as in diagram, and cut out. Fold on dotted lines, and fasten by inserting arrow-head in slit.

Fig. 24. A paper bag. Distribute sheets of paper 22″ by 9″. Mark 4½″ on each side; draw line across, and *fold bottom edge on to this line;* open out; complete the marking out, draw the line for slit, 3″ from bottom; cut out and fold. The side pieces must be stuck down; the flap passes through the slit.

Fig. 25. A match-box tidy. Distribute pieces of card 4½″ by 4¾″. Mark out as in diagram, make deep pencil lines, cut out, fold, and fasten with fasteners as in 25*a*.

Fig. 16.

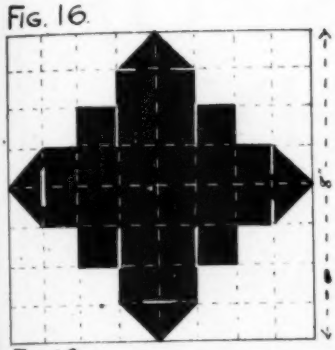


Fig. 17.

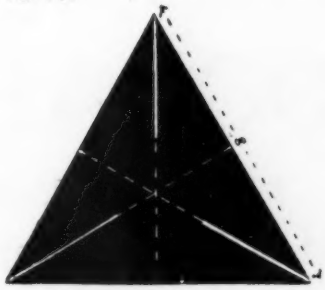
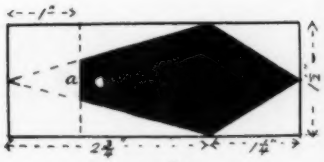


Fig. 18.



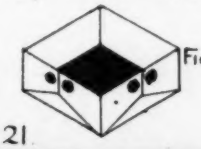
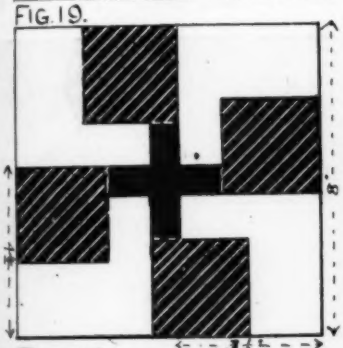


Fig 21a.

Fig. 19.



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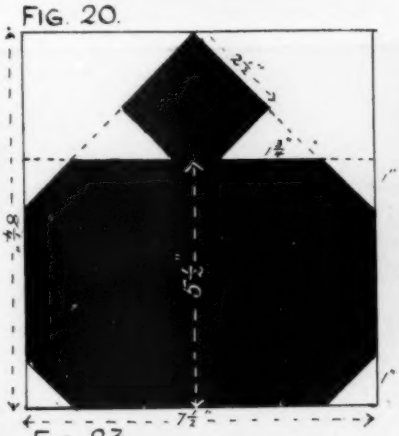

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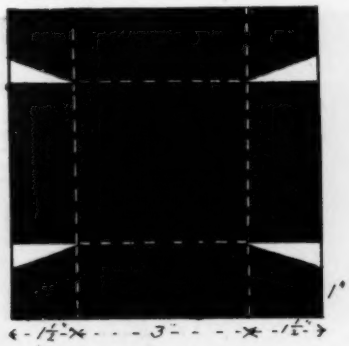

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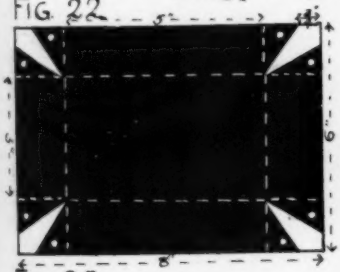
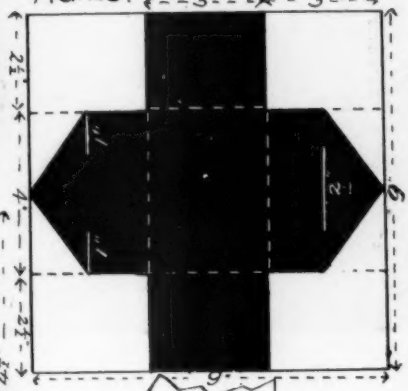


Fig. 23.



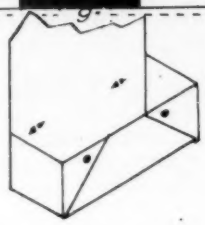
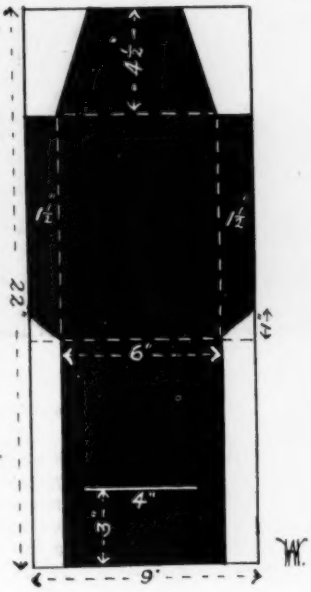


Fig 25a.

Fig. 24.



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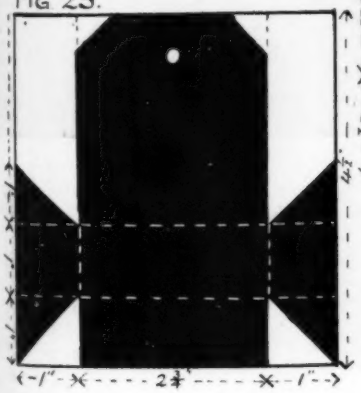

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ABERYSTWYTH PROMENADE, LOOKING NORTH.
(Photo by Eds, Aberystwyth.)

What may Happen at Aberystwyth.

BY ALLEN CROFT.

THE forty-second Annual Conference of the National Union of Teachers will be held in the Pavilion, Aberystwyth, on Easter Monday and three following days; and thus, for the fourth time in the Union's history, the representatives will receive a characteristic Welsh welcome, certainly equal in enthusiasm and cordiality to that evinced at Cardiff, Swansea, and Llandudno. An inaugural reception of the members of Conference by the local committee will take place on Thursday, April 13, in the Council Schools, Alexandra Road, from 5 p.m. to 10 p.m., and is certain to be largely attended. Twenty years ago, when I was a Conference neophyte, very few of the delegates dreamed of journeying to the year's Mecca until Easter Monday; but within recent years the early arrivals have become more and more numerous, until probably at least half the visitors reach the conference town on the day before Good Friday, whilst the remainder establish themselves in their temporary homes on Easter Eve. Personally, the joy of exchanging greetings with literally hundreds of old friends, and the temptation of becoming acclimatised before the serious work of Conference begins, both cause me to pack my bag and set out immediately the Easter holidays begin.

Fortunately, we are to have no Education Bill to upset the arranged agenda this year. Yet it is quite certain that abundance of interest, and probably no little excitement, will mark the proceedings at Aberystwyth. We are to have a lady president for the first time; and although many of us cherish, with the keenest pleasure and gratitude, the memory of the kindness and cordiality which greeted our induction into the chair, it requires no prophetic power to predict that when Miss Isabel Cleghorn, LL.A., headmistress of the Council School, Heeley Bank, Sheffield, is installed, the "record" for heartiness and enthusiasm will easily be attained. It is probably quite unnecessary to-day to sound the praises of this estimable lady, who, apart from much personal charm, possesses—may I be forgiven for committing this sentiment to paper!—that quality all too rare in the gentler sex, the saving grace of humour. I recall, with peculiar pleasure, the circumstance that Miss Cleghorn and I became members of the Executive at the same moment, away back in 1895, so that I speak with some knowledge of her work and influence at Russell Square. I have been with her (and others) in conference with all sorts of eminent individuals from archbishops and presidents of the Board of Education downwards, and have always felt proud that we possessed so able and tactful a protagonist within our ranks. Presentations by the women teachers of London and of the provinces will be made to her before she delivers her presidential address, and (for this occasion only) one almost regrets one's disqualification to participate in these charming tokens of recognition of her work and worth.

Easter Monday morning will be crowded and full of incident, as of yore. At 10 a.m. Conference will be welcomed by the Mayor of Aberystwyth, the Principal of the University College, the Archdeacon of Cardigan, Mr. Matthew L. Vaughan Davies, M.P., the chairman of the Cardiganshire Education Committee, and other local gentlemen; and to the very capable hands of the retiring President, Mr. Marshall Jackman, and the ex-President, Mr. C. W. Hole, is entrusted the task of voicing the representatives' thanks for their reception. Each of these gentlemen can be relied on to deal adequately with any "stray shots" by the way that, almost invariably, are fired off during public receptions. After the exchange of presidents, the golden-mouthed Mrs.

Burgwin will once again bear her testimony to Mr. Jackman's exceptionally fine services to the Union; and her seconder is Mr. J. G. Robson, an invaluable professional asset from Finsbury. The presidential address is followed immediately by the reception of deputations from kindred associations, and although some of the thirteen invited bodies are this year sending no representatives, the number accepting is so numerous that, according to the official programme, "it is necessary to restrict the speeches to one on behalf of each body, and to a period not exceeding five minutes."

The mornings of Tuesday, Wednesday, and Thursday have been allocated for "public" sessions of Conference, and, by virtue of the powers entrusted to them a few years ago, the Executive have selected the *first* resolution for each morning. No one will be disposed to cavil at "Superannuation" having the place of honour on Tuesday morning. Hitherto this peculiarly interesting topic has been regarded as a professional matter pure and simple, and discussed only in "private" sessions. The extraordinary demonstration at Plymouth last year, however, caused the Executive to have the matter dealt with in open court, so to speak, with the whole great public as the jury; and no better man could be found for its sponsor than Mr. T. B. Ellery, whose popular cognomen, "The Apostle of Superannuation," is thoroughly well deserved. His seconder is Mr. Alfred Flavell of Birmingham, the vice-chairman of the Parliamentary Committee, whom I still hope to see wear the highest honours of the Union.

"Supply of Teachers" is the *pièce de resistance* for Wednesday morning, and the resolution on the paper is somewhat different from the one I had the honour of introducing last year. After deploring the waste of public money caused by the indiscriminate certification of teachers by the Board of Education without due regard to the demand for their services, the motion asks that (1) no further supplementary teachers should be recognised by the Board of Education; (2) in future, none but certificated teachers should count as effective staff; (3) no class should exceed forty on the roll; (4) the acting teachers' examination should be abolished; (5) all training colleges should be under the direct control of the Board of Education. This motion is sent up by a dozen metropolitan associations, which have doubtless "looked all round" the question. In the last clause much depends on what is meant by "direct control." I fear, however, that so far as my knowledge goes, the "direct control of the Board of Education" is the worst thing that could happen to the training colleges; but I am amenable to reason, and shall probably be enlightened at Aberystwyth. I think clause 2 is quite absurd until the education grants from State sources are very materially increased.

Wednesday morning will, I trust, witness an absolute novelty so far as N.U.T. Conferences are concerned. For, at the request of the Executive, I have undertaken the responsibility of moving the suspension of the standing orders, in order to discuss "Votes for Women" as the second "order of the day." In the year which before its close will see ladies in the chair of the three largest professional organisations of the country—the N.U.T., the N.F.A.T., and the L.T.A.—it is not only desirable, but absolutely necessary, that the Conference should express its sympathy with the principles of fair play and simple justice. The majority of our members are women; the vast majority want the franchise, and the Conference must do its duty. My seconder is the stalwart Mr. A. W. Dakers, B.A., of Newcastle; and if we can secure urgency for the question, I have little doubt of the result. The President of the Union, Miss Cleghorn, and the vice-chairman of the Ladies' Committee, Miss Goodwin, will propose and second the Executive's motion in favour of the enfranchisement of women should the standing orders be suspended.

On Thursday morning the "State Contribution for Education" has pride of place, and a resolution already agreed to at Hastings, Morecambe, and Plymouth, demanding "immediate relief to the local cost of education, and a new basis of State contribution to education," will be moved by Mr. A. R. Pickles, M.A., who always speaks brilliantly, no matter what his subject may be. His seconder is Mr. W. B. Steer, a fine worker, and an effective speaker of quite a different style, and also a man destined obviously for presidential honours within the next three or four years.

Other subjects that will probably receive considerable attention are "Appointment and Dismissal of Teachers," "Inspection of Schools," "Continuation Schools and Child Labour," "Medical Inspection and School Clinics," and "Compensation to Teachers;" and most sincerely do I hope that "Rural Education" will get its chance.

The business of the "private sessions" begins with a request for the recognition of the devoted services of our veteran treasurer, Mr. G. M. E. Hamilton, and two former presidents, Messrs. John and Hole, who are retiring from the Executive. All three gentlemen have spared neither labour nor ability in advancing the general interests of the members of the Union. "Superannuation" again comes on, and then we shall have undoubtedly an exciting debate on "Parliamentary Representation." West Lambeth wishes to limit the Union's parliamentary representatives to three, whereas the Executive ask for what is practically "a free hand." If time permit, I hope to have an opportunity of moving an alteration to rule, to provide that no teacher shall join the Union who is over fifty years of age. This is a reform long overdue; and I confess that I am becoming a little weary of the teacher who in his best days elects to stand alone, and who wishes to "come in with the rest" when his mental and physical powers are on the wane. A few other professional topics *may* be reached, including "Code of Professional Conduct" and "Teachers as Civil Servants."

The elections are as interesting as ever. The vice-presidency undoubtedly lies between Mr. W. D. Bentliff and Mr. A. W. Dakers, B.A., and probably Mr. Bentliff's "preliminary canter" last year will be the determining factor in his favour. Each gentleman will make an admirable chief officer of the Union. Messrs. Hyden and Rhys Nicholas possibly realise already that their chances are infinitesimal. Most of the present members of the Executive will, I think, retain their seats, though there is a probability of increased representation for the women teachers. The place of Conference lies between Brighton, Great Yarmouth, Hull, and London. Representatives who think with me will say, "To the sea!"

The Editor of the *Practical Teacher* is, I understand, making arrangements for doing honour to Miss Cleghorn by making the issue for May a Ladies' Number, containing a special article by a lady journalist on the Conference, as well as other papers of particular interest to women teachers. We shall, I feel sure, have a record number of our *P. T.*, which will be well worth preservation as a souvenir of Aberystwyth.

A NEW COURSE OF PRACTICAL AND CONSTRUCTIVE WORK,

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BY A. R. PICKLES, M.A., AND DALTON GRANGE.

Lesson 66.—The Equilateral Triangle.

DRAW on coloured paper a rhombus of 3 inches side with an included angle of 60°. Draw the shorter diagonal, and cut along this line. Measure each side of the triangle. What do you know about each of the three sides of the triangle? Give the name equilateral. Why is it called an equilateral triangle? What is the size of one of the angles of the triangle? How do you know? Fold the triangle so as to bring one corner exactly over another corner. What do you know about these angles? What is the size of each? Fold the triangle so as to bring the remaining corner exactly over one of these corners. What do you know about these angles? about all the angles? What is the size of each angle? How could you show that it was 60°? Cut the triangle up (see Lesson 65), and fix the angles in the book so as to prove that their sum is 180°. Fix the other triangle in the book, and write beside it what you know about an equilateral triangle.

What is each angle of the triangle? What kind of angle is this? Give the name of acute-angled triangle to it. Why is it called an acute-angled triangle? (It has three acute angles.) Allow pupils to turn back to Lesson 65 and pick out all the acute-angled triangles. Show pupils now how to construct an equilateral triangle by means of the compass. Give exercises in the construction of equilateral triangles of various sizes.

Construct an equilateral triangle of 3 inches side. Mark the middle point of one side, and join to the opposite corner. Fold along this line, and cut the triangle along this line. Take your set-square and measure the largest angle of one of the new triangles. Are these acute-angled triangles? Why not? Give the name right-angled triangle. Why is it called a right-angled triangle? Allow pupils to turn back to Lesson 65 and find out the right-angled triangles. What were these right-angled triangles made from? Draw a line 2 inches long, and on it try to make a triangle which has two right angles. Why cannot you do it? Can an equilateral triangle be a right-angled triangle? Why not? Fix one of these right-angled triangles in the book. Write beside it its name, and to each angle its size in degrees.

Fix the remaining triangle by the side of the other one so as to form an equilateral triangle. By its side construct another equilateral triangle of 7 cm. side by means of the ruler and set-square. Let the children make this attempt without any help from the teacher. After sufficient time has been given, point out the correct way of constructing the triangle.

Some Exercises.

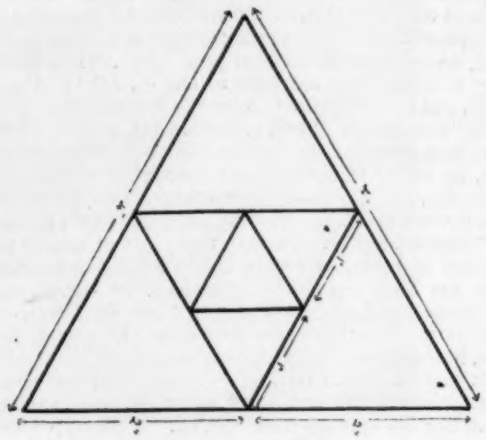
1. Describe an equilateral triangle of 7 cm. side. Draw two parallel lines so as to complete the rhombus.
   (*a*) What is the area of the rhombus? (Height, 6 cm.)
   (*b*) Of the triangle? (Height, 6 cm.)
   (*c*) On the same base construct a rhomboid having the same area as the triangle. What is its height?
   (*d*) What fraction is this rhomboid of the rhombus?
   (*e*) Write down the perimeter of the equilateral triangle.

2. Draw on coloured paper an equilateral triangle of 3 inches side. Fix in the book.
   (*a*) Find its area. (Height, $2\frac{4}{10}$ inches.)
   Mark the middle point of each side, and join the three points so as to form a triangle. Cut out this triangle, and place the four triangles that have been formed one over the other.
   (*b*) What fraction is one small triangle of the large triangle from which it was cut?
   (*c*) What is the area of a small triangle? Work this two ways, and compare your answers. (Height, $1\frac{2}{10}$ inches.)
   (*d*) What is the perimeter of a smaller triangle?
   (*e*) Arrange the four triangles in the book so as to form a rhomboid, and write down its perimeter.

3. Cut out of coloured paper an equilateral of $2\frac{4}{10}$ inches side, and fix in the book.
   (*a*) On an equal base draw a rectangle which has the same area, and write inside its height.
   (*b*) What is the perimeter of this rectangle?
   (*c*) What is the area of the equilateral triangle? (Height, 2 inches.)
   (*d*) Find its perimeter.
   (*e*) Which is the greater, and by how much—the perimeter of the triangle or the perimeter of the rectangle?

Designs.—Introducing the Equilateral Triangle.

Draw the equilateral triangle of 4 inches side. Cut out.



1. What is its area? (Height, $3\frac{1}{2}$ inches.)

Mark the middle point of each side, join the points, and cut along the lines. Place the four triangles one over the other, showing that they are equal.

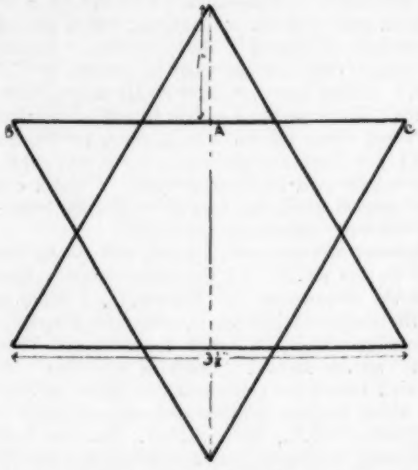
2. What is the area of one of these triangles? (Height, $1\frac{3}{4}$ inches.) Work this sum two ways, and compare the answers.

Fix three of these triangles in the book as shown. (See pupil's page.)

3. What fraction is each of these triangles of the triangle from which it was cut?

Divide this triangle into four triangles as shown. Fix in the book to form the simple border design shown on the pupil's page.

4. What is the total area of these four small triangles?
5. What is the area of one of them?
6. What fraction of the 4-inch triangle is one of these small triangles?
7. What is the total length of the perimeters of the three large triangles in the book?
8. Of the four small triangles?
9. What fraction is the larger answer of the smaller answer?
10. What fraction is the height of the larger triangle of the base?



Draw an equilateral triangle of $3\frac{1}{2}$-inch side. Draw its height, and place a point 1 inch from the top. Through this point A draw a line $3\frac{1}{2}$ inches long parallel to the base of the triangle—that is, $1\frac{3}{4}$ inches on each side of the centre line. On this line draw an equilateral triangle as shown in the diagram. Cut along the thick lines.

Place the equilateral triangles on the top of each other. Show that they are equal. Arrange them on the large piece. Show that it equals the six triangles. Place the pieces in the book as shown. Give the name "hexagon" to the six-sided figure. Children write "hexagon" beside it. Give the name "pentagon" to the five-sided figure enclosed by the five triangles making up the five-pointed star. Children write the word "pentagon" inside the star.

SOME QUESTIONS.

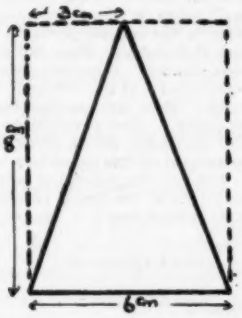
1. What is the perimeter of the hexagon? (Side, 1½ inches.)
2. What is the perimeter of a triangle?
3. Find the perimeter of the pentagon.
4. What is the area of one of the small triangles? (Height, 1 inch.)
5. What fraction of the hexagon is a small triangle?
6. What is the area of the hexagon?
7. Write down the area of the five triangles making up the star.
8. How many triangles must be added to the hexagon to make it a complete equilateral triangle?
9. What would the area of this triangle be?
10. What fraction is the hexagon of this large triangle?

LESSON 67.

The Isosceles Triangle.

Cut out of coloured paper a square of 8 cm. side, a rectangle 6 cm. by 8 cm., and a rhombus of 8 cm. side with an included angle of 60°.

Draw a diagonal of the square, and cut along this diagonal. Cut the rectangle along the thick lines, as shown in the diagram.



Draw the longer diagonal of the rhombus, and cut the rhombus along this diagonal.

Fix one of the triangles from the square, one from the rectangle, and one from the rhombus in the book, as shown below (see Figs. 1, 2, 3). The triangle from the rectangle should be the one made from the two right-angled triangles (see Fig. 2 below). Place the three remaining triangles on one side for future use. Before doing this, place each on its like in the drawing book, and prove that they are similar and equal.

Turn pupil's attention to the triangles in the book. Which is equilateral? Why? Which right-angled? Why?

Measure and write down on each triangle in the book the length of its sides. What do you notice about each triangle? (two sides equal.) Give the name isosceles triangle, and explain "isosceles." What are you thinking about when you say it is an isosceles triangle? If you were thinking of the angles, what name would you give to the first triangle? Why? The second triangle? Why? Is the third triangle an acute angled triangle? Why not? Is it a right-angled triangle? Why not? What are its angles? What shall we call it? Why? Could a triangle have two of its angles obtuse? Why not? Could it have two right angles? Why not? Could it contain a right angle and an obtuse angle? Why not? If one angle is a right angle, what is each of the remaining angles? Why? If one angle is an obtuse angle, what is each of the remaining angles? Why? What kind of a triangle is an equilateral triangle if it be named from its angles? What kind of triangle is an isosceles triangle if it be named from its angles? (acute, obtuse, or right-angled triangle.) Take the three triangles not fixed in the book. Fold the first so that the two equal edges are together. Are any other things equal? Repeat with the two remaining triangles. Which angles in an isosceles triangle are equal? Now write in your book what you have found out about the isosceles triangle.

On a 2-inch line construct an isosceles triangle with equal sides of 3 in. Let pupils use the compass, as in the construction of the equilateral triangle. (Draw attention to method of construction of equilateral triangle before setting this.) Allow pupils to attempt this without any further instructions. Repeat with other measurements.

On a base of 3 in. construct an isosceles triangle, having a height of 2½ in., without the compass. Repeat with other measurements. Take a line 2½ in. long, and on it construct an isosceles triangle, without the compasses, whose equal sides are each 3½ in. long. Repeat with other measurements.

On a base 4½ in. long try to construct an isosceles triangle, each equal side being 2½ in. long, without the compass. Repeat with other measurements of a similar type. (This should bring out the fact that the sum of two sides of a triangle is greater than the third side.)

SOME QUESTIONS.

Triangle 1.

1. What is its area? (8 × 8 ÷ 2.)
2. Measure and write down the length of one of the equal sides in inches.
3. Measure and write down the length of the longest side in inches.
4. What is the size of one of the equal angles in degrees?
5. What fraction is this of the largest angle of the triangle?

Triangle 2.

1. Write down its area.
2. Measure and write down in cm. the length of one of the equal sides.
3. Find the perimeter of the triangle.
4. Reduce the base to a fraction of the height.
5. If one of the equal angles is 75°, what is the third angle?

Triangle 3.

1. Write down its area.
2. Find its perimeter.
3. What fraction of the perimeter is the longest side?
4. Write down the size of the largest angle.
5. What fraction of a right angle is each of the equal angles?

Arrangement of Pupils' Work.

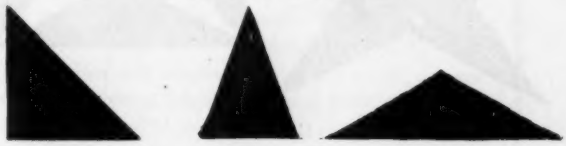


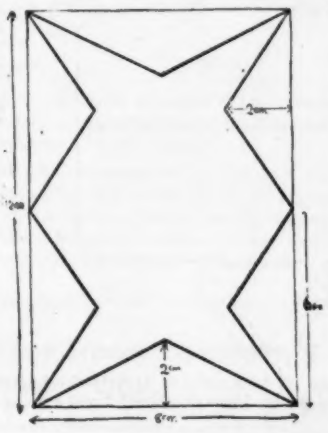
FIG. 1. FIG. 2. FIG. 3.

An isosceles triangle has two sides equal. It has two angles equal. It may be an acute-angled triangle, right-angled triangle, or an obtuse-angled triangle.

1. 32 sq. cm.	1. 24 sq. cm.	1. 28 sq. cm.
2. 3½ in.	2. 8½ cm.	2. 30 cm.
3. 4½ in.	3. 23 cm.	3. $\frac{7}{12}$.
4. 45°.	4. ½.	4. 120°.
5. ½.	5. 30°.	5. ½.

DESIGN.

Draw on coloured paper, as shown in the diagram. Cut out

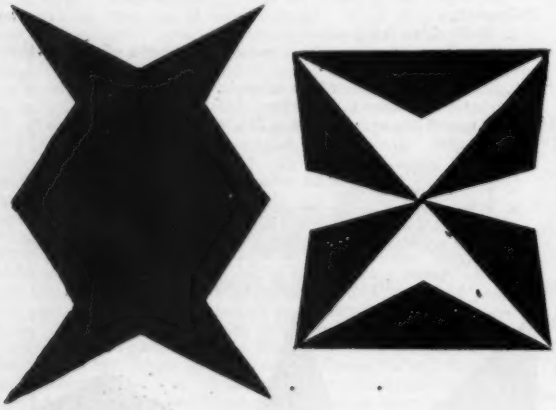


along the thick lines. Allow pupils to fasten the large piece in the book, and then arrange the triangular pieces in the book so as to form some original design.

SOME QUESTIONS.

1. What is the area of the original rectangle ?
2. When the four smaller triangles have been cut away, what fraction remains ?
3. What fraction of the remainder is a smaller triangle ?
4. How many of the smaller triangles could be cut from it ?
5. Find the total area of all the triangles cut away.
6. What fraction of the rectangle remains ?
7. Find the perimeter of the rectangle in inches (eighths).
8. How many times longer is the sum of the two equal sides of the larger triangle than the base ?
9. What is the difference between the perimeters of the two triangles ?
10. Reduce the perimeter of a smaller triangle to the fraction of the perimeter of the original rectangle.

How the Pupils' Page could be Arranged.



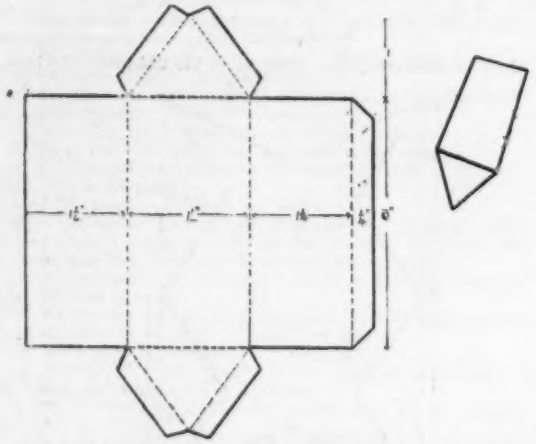
Answers.

1. 96 sq. cm.	4. 16.	7. 15⅓ in.
2. ¾.	5. 40 sq. cm.	8. 1½ times.
3. $\frac{4}{13}$.	6. $\frac{7}{13}$.	9. 4 cm.
		10. $\frac{13}{24}$.

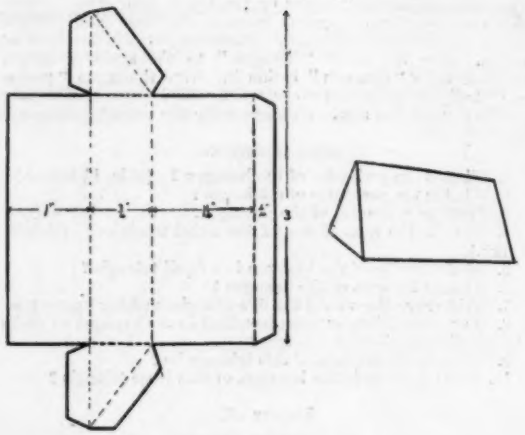
LESSON 68.

The Volume of the Triangular Prism.

Draw as shown in the diagrams. Cut out along the thick lines, folding along the dotted lines. Fix together.



The pupils should be numbered 1, 2, 3—the pupils numbered 1 doing the first model, those numbered 2 and 3 doing the second model.



Ask the pupils numbered 2 and 3 to arrange their models with the sides 1 in. by 3 in. together and facing each other, so as to form a single triangular prism. Explain "prism." Ask the pupil numbered 1 to place his prism by the side of the new prism. Compare the triangular ends of the prisms, the heights, the sloping faces, and the bases. What do you notice ? What fraction is each small prism of the large prism ? Ask pupils now to place that face of the smaller prism on that face of the larger prism to which it is equal. Place both small prisms on the large prism in this manner. What have you made from the three prisms ? How do you find its volume ? Now take away the two smaller prisms. How do you find the volume of the remaining triangular prism ? Now place the two smaller prisms exactly at the end of the larger prism, so as to form one long prism. What is the volume of this equal to ? What is its base equal to ? How do you find the volume of a triangular prism ? Why divide by two ? Place the prism on its triangular end. How could you find its volume now ?

SOME QUESTIONS.

The Larger Prism.

1. What is its volume ?
2. Calculate the area of a sloping face.
3. What is the area of a rectangle which represents the difference between the area of the base and the area of a sloping face ?
4. Find the area of the triangular end of the prism.
5. From this answer calculate the volume of the prism.
6. What fraction is a sloping face of the base ?
7. Reduce the triangular end to a fraction of the base. (In Questions 6 and 7 do not find the areas.)
8. What is the total area of all the faces ?
9. Find the total length of all the edges.
10. Express the length of the shortest edge as a fraction of the longest edge.

The Smaller Prism.

1. What is its volume ?
2. Find the area of the largest face.
3. What is the area of the smallest rectangular face ?
4. Calculate the total area of the three rectangular faces.
5. Find the area of the triangular end of the prism.
6. From this answer calculate the volume.
7. Express the area of the smallest rectangular face as a fraction of the area of the largest rectangular face.
8. Express the remaining rectangular face as a decimal fraction of the largest rectangular face.
9. Express the sum of the two triangular ends as a fraction of the smallest rectangular face.
10. What is the total length of all the edges ?

Answers.

The Larger Prism.		*The Smaller Prism.*	
1. 2¼ cub. in.	6. ⅓.	1. 1½ cub. in.	6. 1½ cub. in.
2. 3½ sq. in.	7. ⅓.	2. 3½ sq. in.	7. ⅓.
3. ¾ sq. in.	8. 13½ sq. in.	3. 2½ sq. in.	8. ·8.
4. ½ sq. in.	9. 17 in.	4. 9 sq. in.	9. ⅓.
5. 2¼ cub. in.	10. $\frac{4}{13}$.	5. ⅜ sq. in.	10. 14¾ in.

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RELIGION, MORALS, AND MANNERS.

A COURSE OF BIBLE TEACHING FOR THE SCHOOL AND HOME.

BY J. EATON FRASER, HEADMASTER OF THE RANMOOR SCHOOL, SHEFFIELD (UNIVERSITY DEMONSTRATION SCHOOL), A LECTURER IN EDUCATION IN THE SHEFFIELD UNIVERSITY.

VI.

Of Courtesy.

THE Bible is not only the text-book of religion and morals; it contains much teaching, by example and by precept, on that phase of conduct which is spoken of as manners. Much is said of the behaviour of the Christian towards those with whom he has to do. It would appear that to be a true Christian a man must needs be a gentleman. We shall take a few of the Bible stories and examine them from this point of view.

Samuel Smiles has a passage on "the true gentleman" as follows: "There are many tests by which a gentleman may be known, but there is one which never fails. How does he exercise power over those subordinate to him? How does he conduct himself towards women and children? How does the officer treat his men, the employer his servants, and man in every station those who are weaker than himself? The discretion, forbearance, and kindness with which power is used in such cases may indeed be regarded as the crucial test of gentlemanly character."

A story occurs quite early in the Bible to which this passage may be applied. The characters of the chief personages of the story are shown by their treatment of those who were weaker than themselves. Applying the test of Mr. Smiles, we can unhesitatingly describe one as a gentleman, the others as bullies.

It is a story of centuries ago, of the days when Egypt held place as the first country of the world in civilisation, wealth, and power. The adopted son of the king's daughter has been forced to flee from the country, and has wandered, lonely and desolate, to the land of Midian. The prince sits down by a well, weary. Presently a troop of seven girls approach the well in order to water their flocks. They draw the water and fill the troughs. Then down upon them swoop a band of selfish shepherds, who drive the women off and appropriate the water for their own flocks. The exiled prince sees this, and despite his loneliness and his troubled spirit he stands bravely up, defends the girls from their oppressors, and then assists them to water their flocks. But let us read the story in its brief, clear setting, keeping the thought upon the character of the men of the tale, as shown by their treatment of those weaker than themselves.

"But Moses fled from the face of Pharaoh, and dwelt in the land of Midian: and he sat down by a well. Now the priest of Midian had seven daughters: and they came and drew water, and filled the troughs to water their father's flock. And the shepherds came and drove them away: but Moses stood up and helped them, and watered their flock. And when they came to Reuel their father, he said, How is it that ye are come so soon to-day? And they said, An Egyptian delivered us out of the hand of the shepherds, and also drew water enough for us, and watered the flock. And he said unto his daughters, And where is he? why is it that ye have left the man? call him, that he may eat bread. And Moses was content to dwell with the man: and he gave Moses Zipporah his daughter" (Ex. ii. 15–21).

The contrast is sharp between the bullying shepherds and the chivalrous prince. Let it be noted that Moses had none to applaud him—no ring of spectators to cheer and praise him. This is the true manliness, the true gentlemanliness. Notice, moreover, that though bred as a prince he does not hesitate to take upon himself what was to Egyptians the work of menials, and this to relieve girls who to him were utter strangers and foreigners. Something of the same spirit was evidently possessed by Lord Edward Fitzgerald. It is said of him that, when travelling in Canada with the Indians, he was shocked by the sight of a poor squaw trudging along laden with her husband's trappings, while the chief himself walked unencumbered. Lord Edward at once relieved the squaw of her pack by placing it on his own shoulders—a beautiful instance of the inbred politeness of the true gentleman.

We may notice also, in the Bible story, the good feeling which is shown by Reuel, priest of Midian, to the man who so generously assisted his daughters.

A little further on in the Bible there comes another story in which the same kindliness, generosity, courtesy, and hospitality are pictured. No more charming idyll of the country and the farm has ever been painted than that contained in the Book of Ruth; and surely there never was knight of chivalry or romance more courteous and gracious to a lady in distress than Boaz, the gentlemanly farmer of Bethlehem. The young widow Ruth has come from a foreign land with the mother of her dead husband. Both are poverty-stricken as well as grief-stricken, and the younger finds herself compelled to go gleaning in the harvest fields. It must have been a sore trial to her—a young foreigner in a cornfield with strange men and strange girls, whose curiosity might easily be attracted to her, and whose treatment of her might easily have been hard to bear. She was keenly sensitive to the differences between her and them, and the young farmer, realising this, charges his men to do nothing to shame her, to be generous to her, and to be careful in every way for her comfort. Men and maidens alike seem to have fallen in with the views of the master, and so the poor exile "kept fast by the maidens of Boaz till the end of the barley harvest and of the wheat harvest." It is a story to read again and again. Would that the courteous, kindly spirit of master and men towards each other and towards the stranger in distress were more widely prevalent in these later days! (See Book of Ruth, chap. ii.)

The two instances we have so far considered are both connected with Oriental peoples of centuries long past. We must not, however, suppose that such courtesy and hospitality were even there and then universal. An example of a sadly different character occurs in the life of our Lord. We must, in order to realise the case, remember the laws of hospitality as practised in Eastern lands. On receiving a guest it was customary to provide water for the weary and dusty feet and perfume for the hair; to give a kiss of welcome; and an invited guest was given a place of honour at table. All reclined upon couches placed round the table. The house was practically open, and any one could have access to the rooms. Now one Simon, a Pharisee, had invited Christ to his house, possibly prompted to do so by curiosity. He regarded himself, of course, as of a much higher caste than this poor prophet, and the true character of the man was exposed by his treatment of this One whom he imagined to be his inferior. Now on this occasion there had stolen into the room also a woman, notorious in the place for her wicked life, carrying an alabaster box of spikenard. "As she stood humbly behind Jesus, and listened to His words, and thought

of all He was and all to which she had fallen, she began to weep and her tears began to fall fast upon His unsandalled feet, over which she bent lower and lower to hide her confusion, until, becoming conscious that whatever others might do the Lord did not loathe and scorn her, she sank upon her knees and began with her long dishevelled hair to wipe the feet which had been wetted by her tears, and then to cover them with kisses, and at last to bathe them with the precious and fragrant nard."

What we have especially to notice in the story is (1) the bearing of the Pharisee to his Guest; (2) the fact that Christ noticed and commented on the host's neglect of the usual courtesies of life; (3) the contrast in the treatment of the woman by Christ and by Simon. Here is the story, which should be read with imagination :—

"And one of the Pharisees desired him that he would eat with him. And he went into the Pharisee's house, and sat down to meat. And, behold, a woman in the city, which was a sinner, when she knew that Jesus sat at meat in the Pharisee's house, brought an alabaster box of ointment, and stood at his feet behind him weeping, and began to wash his feet with tears, and did wipe them with the hairs of her head, and kissed his feet, and anointed them with ointment. Now when the Pharisee which had bidden him saw it, he spake within himself, saying, This man, if he were a prophet, would have known who and what manner of woman this is that toucheth him: for she is a sinner. And Jesus answering said unto him, Simon, I have somewhat to say unto thee. And he saith, Master, say on. There was a certain creditor which had two debtors: the one owed five hundred pence, and the other fifty. And when they had nothing to pay, he frankly forgave them both. Tell me therefore, which of them will love him most? Simon answered and said, I suppose that he, to whom he forgave most. And he said unto him, Thou hast rightly judged. And he turned to the woman, and said unto Simon, Seest thou this woman? I entered into thine house, thou gavest me no water for my feet: but she hath washed my feet with tears, and wiped them with the hairs of her head. Thou gavest me no kiss: but this woman since the time I came in hath not ceased to kiss my feet. My head with oil thou didst not anoint: but this woman hath anointed my feet with ointment. Wherefore I say unto thee, Her sins, which are many, are forgiven; for she loved much: but to whom little is forgiven, the same loveth little. And he said unto her, Thy sins are forgiven. And they that sat at meat with him began to say within themselves, Who is this that forgiveth sins also? And he said to the woman, Thy faith hath saved thee; go in peace" (Luke vi. 36–50).

Judged by the test given by Mr. Smiles, Simon the Pharisee has little of the true gentleman about him. His contemptuous treatment of his invited guest richly deserved to have attention drawn to it in this public manner.

"I entered into thine house: thou gavest me no water for my feet; thou gavest me no kiss; my head with oil thou didst not anoint," said the Christ, and the rich rude Pharisee must have winced at this exposure of his lack of manners! For us the lesson stands that even before Christ these kindly courtesies have value; that as followers of Him we may not stoop to humiliate others, nor hurt them by neglecting the minor moralities of life. And as to the poor woman, notice how, without condoning or palliating any evil she had done, seeing her deep repentance, the Master treated her with gentleness, accepted her devotion, pardoned her sin.

There is yet another instance recorded in which Jesus gave a pointed rebuke and much-needed lesson in politeness and courtesy and "manners," and in which He showed how high a value He set on consideration for the feelings and comfort of others, and to all that is usually associated with the epithets "gentleman" and "gentlewoman." Again He was at the house of a Pharisee as an invited guest. "The invitation was one of those to which he was so often subjected, not respectful or generous, but due either to idle curiosity or to downright malice" (*Farrar*). His host was a man of high position, a distinguished company was present, and scarcely was the feast ready when there arose one of those unseemly struggles for precedence which, universal as they are, show the tendencies of human nature on its most contemptible side. The "chief seat" was the middle seat in the central *triclinium*. A rush appears to have been made for this and the adjacent seats, and this struggle grated upon His spirit, and led Him to lay down a better principle of social courtesy founded upon spiritual humility.

"And it came to pass, as he went into the house of one of the chief Pharisees to eat bread on the sabbath day, that they watched him. And he put forth a parable to those which were bidden, when he marked how they chose out the chief rooms; saying unto them, When thou art bidden of any man to a wedding, sit not down in the highest room; lest a more honourable man than thou be bidden of him; and he that bade thee and him come and say to thee, Give this man place; and thou begin with shame to take the lowest room. But when thou art bidden, go and sit down in the lowest room; that when he that bade thee cometh, he may say unto thee, Friend, go up higher: then shalt thou have worship in the presence of them that sit at meat with thee. For whosoever exalteth himself shall be abased; and he that humbleth himself shall be exalted. Then said he also to him that bade him, When thou makest a dinner or a supper, call not thy friends, nor thy brethren, neither thy kinsmen, nor thy rich neighbours; lest they also bid thee again, and a recompence be made thee. But when thou makest a feast, call the poor, the maimed, the lame, the blind: and thou shalt be blessed; for they cannot recompense thee: for thou shalt be recompensed at the resurrection of the just" (Luke xiv. 1, 7-11; xx. 46).

The lesson in politeness is by no means unnecessary to-day. It is possible that even Christian people do not attach due importance to these so-called "minor moralities" of life. Too often indeed a man, a Christian man, may be rude, ill-mannered, boorish; but we are inclined to excuse him. "These are his failings," we say, and we think of them as the hump on the camel's back—ungainly, no doubt, but then the creature was made so. A lady once appealed to Tennyson to explain a certain passage in one of his poems. The poet replied as follows, "I merely supply the poetry to the English people—not brains." His biographer remarks that "his friends always understood that the rough manner concealed a genuine cordiality." But what is the worth of a geniality so concealed? What of the feelings of the one who received so brutal and boorish a letter? Surely the epistle was unworthy of the man who wrote,—

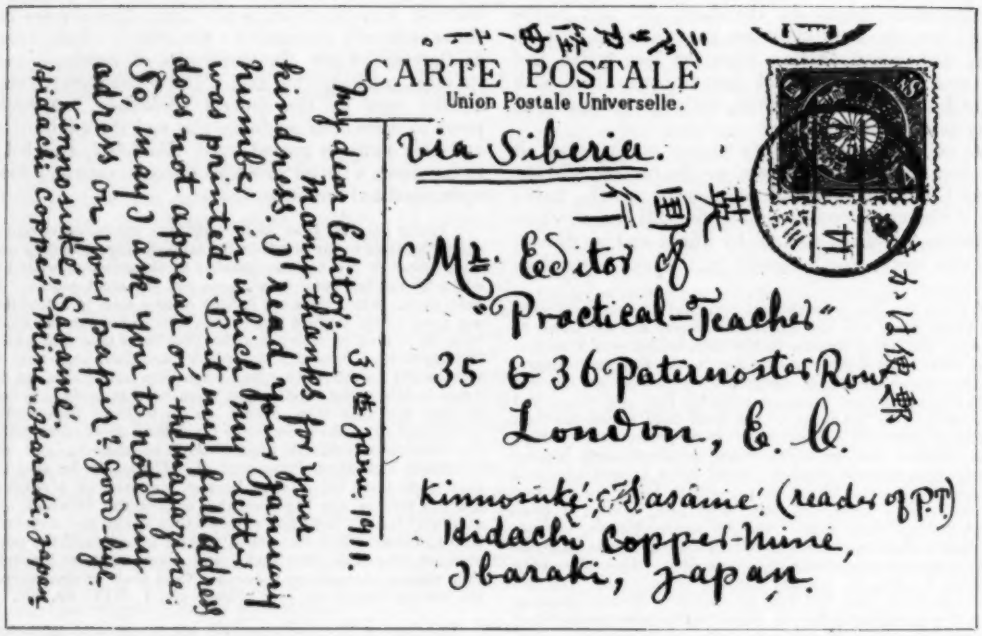
"Manners are not idle, but the fruit of noble nature and of loyal mind."

The teaching of the Bible is clear. Gentlemanliness, courtesy, consideration for others, and especially for the weaker and more unfortunate, good manners, *politesse de cœur*—these are everywhere inculcated, and especially are they exhibited in the life of the Master, "the first True Gentleman that ever breathed."

A BOOK NOTE.

MESSRS. WILLIAMS & NORGATE announce for immediate publication the finally corrected edition of Herbert Spencer's *Essays on Education* in a cheap and popular form, bound in cloth at one shilling net. Special attention is drawn to the fact that this edition embodies the author's latest corrections, made about a year before his death, and it is only in this edition that it will be possible to obtain the author's maturer thought on the subject of *Education: Intellectual, Moral, and Physical*. This cheapening of books of real worth for the teacher's home library is a movement which has our hearty support, and we sincerely hope it will be extended.

Far and Near.



The Summit of Achievement.

LIFE is nothing without an object. Some people work for fame, others for a gramophone or a pianola; but the height of ambition is surely reached in the following extract from an entertaining article in the *Lady* on travel in China :—

> "My next visit was of a very different character. We spent the afternoon with a respectable farmer's family. The farmer's wife welcomed us warmly, and regaled us on tea and boiled eggs—a dish of twenty or thirty boiled eggs, to be eaten without bread or salt or any accessory whatever except the tea! The farmhouse was built of mud, with walls two feet thick, and the windows were almost non-existent. The place looked poverty-stricken, but the farmer's wife spoke of recent prosperity. Crops had done well, and she and her husband had been able to purchase that which they had been wanting for some years past. She took us to see the newly-bought treasures. We peered in through the door, and the good woman's face beamed with pride and pleasure. There they were straight in front of us, made of polished wood, black as ebony—two magnificent coffins!"

Food for Thought.

Mark Rutherford is for the mood contemplative, and offers the following in *More Pages from a Journal*, published recently by Mr. Henry Frowde :—

> "The highest education is that which teaches us to guide ourselves by motives which are intangible, remote, incapable of direct and material appreciation."
>
> "The certainty which comes of intelligent conviction is a tempered certainty. Its possessor knows the difficulty of the path by which he has reached it, and the reasons which on his way have appeared so potent against it. Fanaticism is the accompaniment of conclusions which are not the result of reason."
>
> "Controversy is demoralising. Never suffer yourself to become an advocate. Never rely on controversy to convince. Say what you have to say and leave it. *Do* it if you wish to persuade."
>
> "People are often unkind, not from malignity, but from ineptitude."
>
> "What a vile antithesis is that between a man and his faults! If I love a man, I do not love his faults, for they are abstractions, but I love the man *in* his faults. Are they not truly himself? He is often more himself in his faults than in his virtues."
>
> "We have no capitalised happiness, nothing on which to draw when temporary sources fail."
>
> "What we have toiled after painfully often lies unused. No opportunity occurs for saying or doing a tithe of it. The hour demands its own special wisdom."

Justice at Last.

I have always felt that George Washington laboured heavily under the priggish reputation conferred upon him by that story of the cherry tree. It is therefore with very keen pleasure that I assist in giving currency to another story, which will help to reinstate him in public opinion, even on this side of the herring-pond.

> "As an example of Washington's fearlessness, Sparks, the historian, tells of an occasion when Washington was aroused to quick action upon discovering a poacher on his grounds. Hearing the discharge of a gun, he mounted his horse, and, riding in the direction of the sound, soon found the intruder, who quickly jumped into his canoe and paddled out into the river. Washington rode instantly into the water, in spite of the poacher's threatening him with his fowling piece; and seizing the boat, he drew it to the shore, disarmed the poacher, and gave him a sound thrashing then and there."

It is to be hoped that this little incident will be duly cut out by all editors of school readers.

Bonfire Night.

The situation of the Coronation bonfires will provide an interesting lesson in physical geography. It is proposed that a rocket shall be fired from the top of the Malvern Hills, which will be regarded as the centre of

the bonfire festivities, and that this and other rockets fired from the loftiest summits throughout the country shall be the signal for the lighting of a chain of fires. The following is a list of a few of the hills where it is expected bonfires will be placed:—Leith Hill, Surrey; Harrow-on-the-Hill, Middlesex; Chiltern Hills, Bucks; Westerham Hill, Kent; Shooter's Hill, Kent; Heights of Abraham, Derbyshire; Beachy Head, Sussex; South Downs, Sussex; Hog's Back, Surrey; Hampstead Heath, County of London; Sydenham Hill, Kent; Wendover, Bucks; Hensbarrow Beacon, Cornwall. There will be about 2,000 Coronation bonfires, and each will fly the Union flag until the lighting ceremony begins.

The Modern Evil Eye.

"The nerves, we are told," says Lucy H. Yates in the *Country Home*, "touch the soul on the one side and the body on the other, and we must work for freedom of soul and body in response to spiritual and physical law if we want to get sick nerves well. To sum it all up—if you want to help yourself out of 'nerves,' learn to rest when you rest, and work without strain when you work; learn to loosen out the muscular contractions which the nerves cause; learn to drop the mental resistances which cause the nerves, which take the form of anger, resentment, worry, anxiety, impatience, annoyance, or self-pity; eat only nourishing food; eat it slowly, and masticate it well; breathe the freshest air you can find, and breathe it deeply, gently, and rhythmically; take what healthy, vigorous exercise you find possible; do your daily work to the best of your ability; give your attention so entirely to the process of gaining health for the sake of your work and other people that you have no mind left with which to complain of being ill, and see that all this effort aims toward a more intelligent obedience to and trustfulness in the Power that gives us life. Wholesome sustained concentration is the very essence of healthy nervous life."

It looks very easy on paper—almost as easy as Eustace Miles's rule, "Go and do whatever you don't feel inclined to do."

"My Maryland."

Mrs. Burton Harrison's "Recollections, Grave and Gay," in this month's *Scribner* make excellent reading:—

> "It was Jenny Cary of Baltimore who set Randall's stirring poem of 'Maryland' to the air of 'Lauriger Horatius,' and first sang it with a chorus of her friends in a drawing-room in Baltimore. She tells me that the refrain, as originally printed in the copy of verses cut by them out of a newspaper, was simply 'Maryland!' and that she added the word 'my' in obedience to the exigency of the music. As the song thus boldly chanted by young Confederate sympathisers, in a city occupied by their enemy and under strict martial rule, was to drift over the border, to be caught eagerly by the troops of the Maryland line, and to echo down the ages as the most famous battle-song of the Confederacy, it is fitting that to Miss Jenny Cary should be awarded all the honour of this achievement. We both sang it amid a little group of visitors in September 1861, standing in the doorway of Captain Sterrett's tent at Manassas, the men of the Maryland line facing us in the dusk of evening. This was in answer to the request sent in from the soldiers to their friend, Captain Sterrett, 'that they might hear a woman's voice again.' I can hear now the swing of that grand chorus, as the men gradually caught up the refrain and echoed it, and by next day, to my cousin's joy and pride, the whole camp at Manassas was resounding with 'MY Maryland!'"

A Coronation Note.

In his new volume, *Wood Carvings in English Churches* (Henry Frowde), Mr. Francis Bond refers to the Coronation Chair at Westminster, "which has a long if somewhat unreliable history behind it. The stone beneath it is said to have been the one on which Jacob's head rested at Bethel; from whence it travelled to Egypt, and thence to Spain, Ireland, and lastly Scotland. King Kenneth of Scotland had the following inscription engraved on it in Latin verse:—

> 'Ni fallat fatum, Scoti quocunque locatum
> Invenient lapidem regnare tenentur ibidem'—

a prophecy curiously fulfilled on the accession of James I. to the English throne. On the upper surface of the stone is a rectangular groove large enough to receive an inscribed plate. Edward I. found the stone in 1296 at Scone Abbey, where the Scottish kings had always been crowned on it. He carried it to London, and in 1300 Master Adam, the king's goldsmith, was working at a bronze chair to hold it. But when this was nearly finished, the king altered his mind, and had a copy of it made in wood—the present chair—which cost 100s., by Master Walter, the king's painter. The chair has lost the quatrefoils in front, and the lions are of recent date. It originally stood in the same position as a bishop's chair—that is, at the back of the high altar and in front of the shrine of Edward the Confessor, and facing to the west. It is made of oak, fastened together with pins; the surface was first covered over with the usual gesso; then gold was applied by means of white of egg, and burnished; then minute dots, forming diapers of foliage, beasts, birds, etc., were pricked on the surface of the gold, taking care not to penetrate it, with a blunt instrument before the ground and gilding had lost their elasticity—a most tedious and delicate process. A second chair, modelled on the older one, was made on her coronation for Mary II., Queen of William III. It used to stand by the side of the king's chair, but has been moved to the easternmost recess of Henry VII.'s chapel."

A Pretty Story for the Little Ones.

There are many stories of St. Bridget's miracles, all of which show her gentle, kindly ways. One of the prettiest tells how she was caught in a heavy shower one day, and hurried back to her cell, where she took off her wet cloak and threw it over a sunbeam which had strayed in through the narrow window, as she mistook it for a beam of wood in her haste. The sunbeam upheld the cloak till long after the sun had gone down, and when at last St. Bridget was told what had happened, she went in and took the cloak away, and the belated sunbeam disappeared.

Method Up-to-date.

We have already quoted from the *Report of the L.C.C. Conference*, which forms an excellent manual of method, and is published at 1s. 9d., post free, by P. S. King and Son of 2 and 4 Great Smith Street, Victoria Street, Westminster, S.W. We give the following extract from a paper entitled "Animals in Infants' Schools," by Mrs. Sandford, headmistress of the Rolls Road L.C.C. schools:—"We started with no assets but a cheerful optimism and an injured sparrow extracted from a tiny trousers pocket. The sparrow was a pioneer—all honour to him. He had tried with the over-assurance of youth to negotiate too early in life the downward descent of a drain pipe, with disastrous results to himself and never-ending results to us. His rescuer became his keeper until such time as the bird was able to fly away, ungrateful to the end. Then we purchased a

pair of doves in a small wicker cage, giving them periodical freedom, and appointing a keeper and a helper to attend to their wants. Now our time table showed a new entry in one class, 'The care of school pets, 9.50 to 10 a.m.' Soon the truth that to call the dove 'an emblem of peace' is a fallacy was only too clearly proved, with the result that my colleague quickly built a large dove aviary, and fitted it cleverly into a wide window ledge. The sole materials used were broken egg boxes and wide-meshed wire netting. There was a movable tray beneath; a large flower-pot saucer was bath and drinking trough; natural perches were formed of tree boughs stripped of their leaves. The Rolls Road doves have similar cages, but scientifically and strongly made. So much at home and so happy are our doves that since August they have hatched out a promising family of five, making a nest in a large flower pot. The whole process of hatching the eggs, feeding the baby birds, and watching them grow, proves a never-ending source of interest to the children, who incidentally gain much useful information. The doves are fed on dari, which costs 2½d. per quart." There is an excellent article on stencilling as a school occupation by Mr. A. E. D. Lowden of Laburnum Street L.C.C. School, which we can recommend to our readers interested in this increasingly popular branch of school work.

What Folk Songs Are.

The following simple description may be found useful for teaching purposes :—

> "One of the finest pleasures in the world is derived from singing. Even savages make an effort to sing by uttering weird notes as they beat on queer drums and dance around their war fires. In ancient times, before there were any pianos, people sang sometimes to the clapping of their hands, and often to the accompaniment of crude instruments which looked like old-fashioned guitars, violins, or harps. Their songs told of battles, love, harvest-time, hunting, and other events in their lives. Before men knew how to write and print music, songs were preserved by being treasured in the memory of the people. Every country had its own peculiar songs, which were passed down from father to son, sometimes through hundreds of years. In more modern times interested people have from time to time printed collections of these songs of the different nations, and nowadays there are many enthusiastic collectors who are printing these songs so that we may all know them. This kind of music is called folk songs. These include the songs which the 'folk,' or people, sing and treasure in their heart and memory."

MY BOOKSHELF.

BY AN INSPECTOR OF SCHOOLS.

(*Continued from page 641.*)

THERE are books galore on the teaching of special subjects, but few can surpass Dewey and M'Lellan's *Psychology of Number*. It is not an easy book, but it is vigorously written, and the later chapters deal with the actual teaching of arithmetic. The teacher will find here some of the reasons which justify modern methods of teaching mathematics; but the book deals with number only, and not with any correlated scheme involving handwork.

It is a little unfortunate that, while enormous strides have been made in this country in the teaching of practical mathematics during the last few years, nearly everything that has been written upon it is buried in the back numbers of magazines. But it is doubly unfortunate that most of this writing has been done from the point of view of the subject, and that the mental processes involved have been ignored. The leaders of the movement have either confined their attention to an indiscriminate medley of "tips," or delivered themselves of a ready-made scheme without seeking to establish it on a scientific basis. The same criticism may be passed on the next three books to be noted, which deal with the teaching of physical science.

The first of these is an American book, *The Teaching of Chemistry and Physics*, by Professors Smith and Hall. It contains an enormous amount of valuable information on the arrangement of the work and the presentation in the classroom, but there is no suggestion that it is based on an accurate study of the human mind in its power of assimilating knowledge; and the second part is more frankly empirical than the first. The book ought to be read for the sake of comparison and inquiry into one's own methods.

Notes on the Teaching of Elementary Chemistry, by J. B. Russell, is an ingenious attempt to overcome a well-known difficulty which the science teacher has to face—that is, the question as to whether or no the class should be provided with a text-book. It is not easy to make boys think when they can look a point up in their books; and yet it is difficult to secure that beginners shall take sufficiently full notes to be of real value for reference. The plan under notice is to issue the text-book to the class in four or more pages at a time. These are filed by each pupil in a Stoltzenberg file. Apart from this feature, the book deserves credit for the extremely careful way in which the lessons are worked out, and for the ingenuity of some of the experiments. The scope is quite elementary, and the book would be exceedingly useful to teachers in higher elementary schools, trade preparatory schools, and the upper standards of elementary schools which are provided with laboratories.

For more advanced work in chemistry, far and away the best model which has been worked out is that in Wilson and Hedley's *Experimental Chemistry*. The scheme of lessons follows essentially the Herbartian five (or four) step method, though that is not definitely stated, and possibly the authors are unaware of it. No young science master just beginning his work can afford to be without this book.

The writer never felt as a teacher that he could depend entirely upon mere text-books. So many of these have been written specially for examinations, and so many examiners imagine that schoolboys ought to subsist at first on the dry bones of knowledge, that the fairyland of science has been utterly ignored. Yet it is certain that many a man's passion for science has been developed by reading about or seeing things quite outside the ordinary school syllabus. There are a number of books which scorn limitations, and which seek to bring within the range of those who are on the threshold some of that romance which rouses to enthusiasm and spurs to ever-increasing effort.

It may, therefore, be not without interest to include notes on a few of these books. The first that attract my notice—possibly because they are among the oldest on my shelves—are in the "Romance of Science Series," published by the Society for the Propagation of Christian Knowledge. Of these, special mention should be made of Boys' *Soap Bubbles, and the Forces which Mould Them*; Perry's *Spinning Tops*; Meldola's *Coal, and What We may get from It*; Worthington's *Splash of a Drop*; and Tidy's *Story of a Tinder-Box*.

Our Query Column.

SOLUTIONS BY A. CLEMENT JONES, M.A., PH.D., SENIOR MATHEMATICAL MASTER, BRADFORD GRAMMAR SCHOOL.

RULES.

1. Each correspondent is restricted to *one* question.
2. Each query must be accompanied by the name and address of the correspondent, and the *coupon* which appears on the back wrapper of the current number of the Journal.
3. CORRESPONDENTS MUST IN ALL CASES STATE THE SOURCE FROM WHICH THEIR QUERY HAS BEEN OBTAINED.

The Editor reserves to himself the right to decline to answer any question which is, in his judgment, unsuited to the Magazine.

Libra.—If $m + n$ be even, prove

$$\int_0^{\frac{\pi}{2}} \cos^m\theta \cdot \cos n\theta \cdot d\theta = \frac{\pi}{2^{m+1}} \cdot \frac{m\,!}{\frac{m+n}{2}\,!\,\frac{m-n}{2}\,!}$$

(Edwards's *Integ. Calc.*)

Now, $(m+n)\cos^m\theta \cdot \cos n\theta$

$= n\cos^m\theta \cdot \cos n\theta + m\cos^{m-1}\theta \cdot \cos\theta\cos n\theta$

$= n\cos^m\theta \cdot \cos n\theta + m\cos^{m-1}\theta\,(\cos\overline{n-1}\,\theta - \sin\theta\sin n\theta)$

$= n\cos^m\theta \cdot \cos n\theta - m\cos^{m-1}\theta \cdot \sin\theta \cdot \sin n\theta + m\cos^{m-1}\theta \cdot \cos\overline{n-1}\,\theta.$

$\therefore \quad (m+n)\cos^m\theta \cdot \cos n\theta = \frac{d}{d\theta}(\cos^m\theta\sin n\theta) + m\cos^{m-1}\theta \cdot \cos\overline{n-1}\,\theta.$

Let $\quad f(m,n) = \int_0^{\frac{\pi}{2}} \cos^m\theta \cdot \cos n\theta \cdot d\theta,$

thus integrating the equation just found,

$$(m+n)f(m,n) = mf(m-1,n-1).$$

If $m > n$, we have then

$$(m+n)f(m,n) = mf(m-1,n-1)$$
$$(m+n-2)f(m-1,n-1) = (m-1)f(m-2,n-2)$$
$$(m+n-4)f(m-2,n-2) = (m-2)f(m-3,n-3)$$
$$\cdots\cdots\cdots\cdots\cdots\cdots\cdots$$
$$(m-n+4)f(m-n+2,2) = (m-n+2)f(m-n+1,1).$$

But $\quad f(m-n+1,1) = \int_0^{\frac{\pi}{2}} \cos^{m-n+2}\theta \cdot d\theta,$

and since $m+n$ is even, and therefore $m-n$ also, this integral

$$= \frac{m-n+1}{m-n+2} \cdot \frac{m-n-1}{m-n} \cdot \frac{m-n-3}{m-n-2} \cdots \frac{3}{4} \cdot \frac{1}{2} \cdot \frac{\pi}{2}$$
$$= \frac{(m-n+1)(m-n-1)\ldots 3 \cdot \pi}{(m-n+2) \cdot 2^{m-n+1} \cdot \frac{m-n}{2}\,!}$$

Hence $\quad f(m,n) = \frac{m(m-1)(m-2)\ldots(m-n+2)}{(m+n)(m+n-2)\ldots(m-n+4)} \times \frac{(m-n+1)(m-n-1)\ldots 3 \cdot \pi}{(m-n+2) \cdot 2^{\frac{m-n+1}{2}} \cdot \frac{m-n}{2}\,!}$

$$= \frac{\pi \cdot \lfloor m}{2^{\frac{m+n}{2}} \cdot \frac{m+n}{2}\,!\,2^{\frac{m-n+1}{2}} \cdot \frac{m-n}{2}\,!}$$

$$= \frac{\pi \lfloor m}{2^{m+1} \cdot \frac{m+n}{2}\,!\,\frac{m-n}{2}\,!}$$

D'Arcy.—Evaluate (i) $\int_0^{\frac{\pi}{2}} \sin x \log\sin x\, dn.$

(ii) $\int_0^{\frac{\pi}{2}} \tan x \log\sin x\, dn.$

(iii) $\int_0^{\frac{\pi}{2}} \sin m \log\tan x \cdot dn.$

(Edwards's *Integ. Calc.*)

(i) $\int_0^{\frac{\pi}{2}} \sin x \log\sin x\, dn = \tfrac{1}{2}\int_0^{\frac{\pi}{2}} \sin x \cdot \log\sin^2 x \cdot dn$

$= -\tfrac{1}{2}\int_0^{\frac{\pi}{2}} \log(1-\cos^2 x) \cdot d(\cos x)$

$= \tfrac{1}{2}\int_0^1 \log(1-z^2) \cdot dz$ (hence expanding)

$= -\tfrac{1}{2}\left[\frac{z^3}{3} + \frac{z^5}{2.5} + \frac{z^7}{3.7} + \frac{z^9}{4.9} + \ldots\right]_0^1$

$= -\tfrac{1}{2}\left[\frac{1}{3} + \frac{1}{2.5} + \frac{1}{3.7} + \frac{1}{4.9} + \ldots\right]$

$= -\frac{1}{2.3} - \frac{1}{4.5} - \frac{1}{6.7} - \frac{1}{8.9} - \ldots$

$= -\frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \frac{1}{5} - \frac{1}{6} + \frac{1}{7} - \ldots$

$= \log 2 - 1.$

(ii) Similarly,

$$\int_0^{\frac{\pi}{2}} \tan x \cdot \log\sin x = -\tfrac{1}{2}\int_0^{\frac{\pi}{2}} \frac{\log(1-\cos^2 x)}{\cos x} \cdot d\cos x$$

$$= \tfrac{1}{2}\int_0^1 \frac{\log(1-z^2)}{z} \cdot dz$$

$$= -\tfrac{1}{2}\int_0^1 \left(z + \frac{z^3}{2} + \frac{z^5}{3} + \ldots\right) dr$$

$$= -\tfrac{1}{2}\left(\frac{1}{2} + \frac{1}{2.4} + \frac{1}{3.6} + \frac{1}{4.8} + \ldots\right)$$

$$= -\left(\frac{1}{2^2} + \frac{1}{4^2} + \frac{1}{6^2} + \frac{1}{8^2} + \ldots\right) = -\frac{\pi^2}{24}.$$

(iii) $\int_0^{\frac{\pi}{2}} \sin 2x \log\tan x\, dx$

$$= \int_0^{\frac{\pi}{2}} \sin 2\left(\frac{\pi}{2} - x\right) \cdot \log\tan\left(\frac{\pi}{2} - x\right) dx$$

$$= \int_0^{\frac{\pi}{2}} \sin 2x \cdot \log\cot x\, dx$$

$$= -\int_0^{\frac{\pi}{2}} \sin m \log\tan x \cdot dx;$$

that is, the integral is zero.

Paladin.—Two ellipses have a common focus and equal minor axes. Show that their common tangents are parallel.

Let S be the common focus, H, H′ the other foci. Let SY, HZ, H′Z′ be perpendiculars from the foci on a common tangent to the ellipses. Then

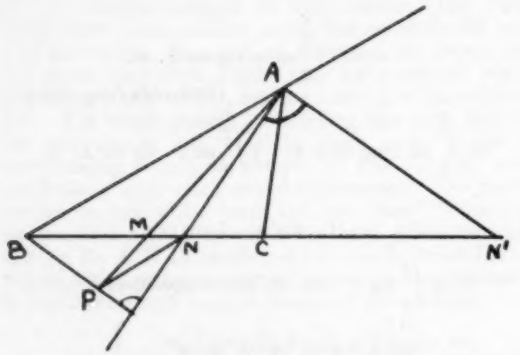
$$SY \cdot HZ = SY \cdot H'Z' = (\text{semi-minor axis})^2.$$

Thus $HZ = H'Z'$.

∴ the common tangent is parallel to HH′. Similarly, the other common tangent.

Rufus.—A, B are two fixed points, u a fixed line. If P be any point of u, and p be harmonically conjugate to u with regard to PA, PB, show that p passes through a fixed point.

(Filons's *Projective Geometry*.)



Let AB meet u at D, and let C be the harmonic conjugate of D with respect to A and B; then C is a fixed point. If P is any point on u, then PA, PB are harmonic conjugates of PC and PD—that is, p in the question is the line PC, and passes through the fixed point C.

Fell.—Find the co-ordinates of the limiting position when $a' = a$, $b' = b$ of the intersection of the straight lines

$$\frac{x}{a} + \frac{y}{b} = 1, \quad \frac{x}{a'} + \frac{y}{b'} = 1,$$

where $a^n + b^n = a'^n + b'^n = 2c^n$.

Find the co-ordinates of the point on the locus of the limiting position of the intersection, which is at a maximum distance from the origin, and prove that the maximum distance is $\frac{c}{\sqrt{2}}$.

Let $a' = a + \lambda$, $b' = b + \mu$, where λ and μ ultimately vanish, therefore we omit λ^2, μ^2, and higher powers. For point of intersection required we have

$$\frac{x}{a} + \frac{y}{b} = 1, \text{ and } \frac{x}{a+\lambda} + \frac{y}{b+\mu} = 1.$$

The latter gives

$$\frac{x}{a}\left(1 - \frac{\lambda}{a}\right) + \frac{y}{b}\left(1 - \frac{\mu}{b}\right) = 1,$$

and consequently

$$\frac{\lambda x}{a^2} + \frac{\mu y}{b^2} = 0. \quad \ldots\ldots \quad \text{(i)}$$

But $$a^n + b^n = (a+\lambda)^n + (b+\mu)^n$$
$$= a^n + b^n + n\lambda a^{n-1} + n\mu b^{n-1}.$$

Thus $$\lambda a^{n-1} + \mu b^{n-1} = 0. \quad \ldots\ldots \quad \text{(ii)}$$

Combining (i) and (ii),

$$\frac{x}{a^{n+1}} = \frac{y}{b^{n+1}}$$

$$= \frac{\frac{x}{a} + \frac{y}{b}}{a^n + b^n} = \frac{1}{2c^n}.$$

∴ the point of intersection required is

$$\left\{\frac{a^{n+1}}{2c^n}, \frac{b^{n+1}}{2c^n}\right\}.$$

The distance of this point from the origin is a maximum when $a^{2n+2} + b^{2n+2}$ is a maximum—that is, when

$$a^{2n+1} \cdot da + b^{2n+1} \cdot db = 0.$$

Put from the condition $a^n + b^n$ = constant,

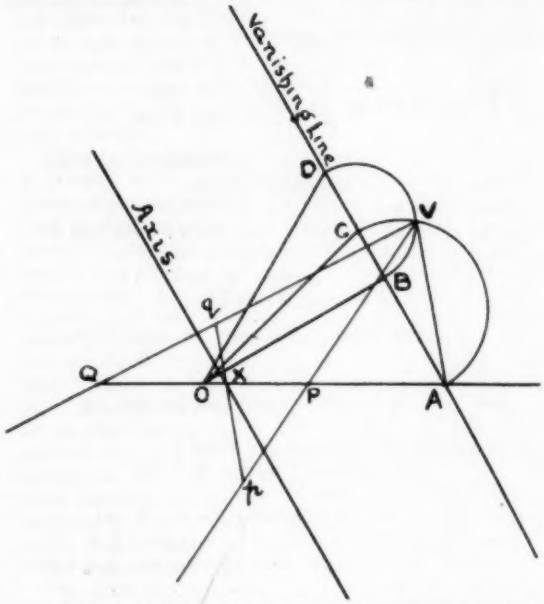
$$a^{n-1}\,da + b^{n-1}\,db = 0.$$

∴ $$a^{n+2} = b^{n+2}. \quad \therefore \quad a = b.$$

From given condition, therefore, $a = b = c$.

∴ the point farthest from the origin is $\left(\frac{c}{2}, \frac{c}{2}\right)$, and its distance from the origin is $\frac{c}{\sqrt{2}}$.

François.—The angles AOB, BOC, COD, all measured in the same sense, are 30°, 15°, 15° respectively. (OA, OC) and (OB, OD) are pairs of conjugate diameters of a hyperbola. Construct a plane perspective relation which will transform this hyperbola into a circle, and at the same time the line perpendicular to OB at a distance of 2″ from O into the line at infinity, the distance between the two points on OA, each 1″ from O, transforming into a length 1·5″. (B.Sc., London, 1910.)



Let the given vanishing line cut the given conjugate diameter at A, B, C, D. On AC and BD describe semi-circles meeting at V. If we project from V with AB for vanishing line, the pairs of lines OA . OC and OB . OD project into lines parallel to VA . VC and VB . VD—that is, lines at right angles. The hyperbola therefore projects into a conic having two pairs of orthogonal conjugate lines—that is, a circle.

Let OP = OQ = 1″. Join VP . VQ. Place a line pq of length 1·5″ with its end on VP . VQ and parallel to VA. Thus, by the data, PQ projects into pq. If pq meet PQ at X, a line through X parallel to AB (the vanishing line) is the axis of perspective.

Nomen.—Solve

$$cy + bz = bc,$$
$$az + cx = ca,$$
$$bx + ay = ab.$$

Divide the equations by bc, ca, ab respectively, and we obtain

$$\frac{y}{b} + \frac{z}{c} = 1, \quad \ldots\ldots \quad \text{(i)}$$

$$\frac{z}{c} + \frac{x}{a} = 1, \quad \ldots\ldots \quad \text{(ii)}$$

$$\frac{x}{a} + \frac{y}{b} = 1. \quad \ldots\ldots \quad \text{(iii)}$$

Add the three equations; hence

$$\frac{x}{a} + \frac{y}{b} + \frac{z}{c} = \frac{3}{2}. \quad \ldots\ldots \quad \text{(iv)}$$

Take (i), (ii), and (iii) in turn from (iv), hence

$$\frac{x}{a} = \frac{1}{2}, \quad \frac{y}{b} = \frac{1}{2}, \quad \frac{z}{c} = \frac{1}{2};$$

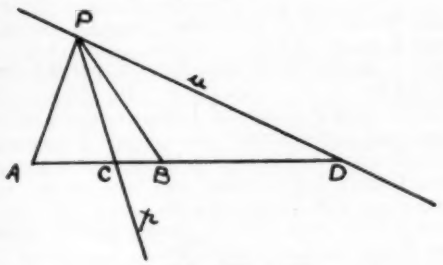
that is, $$x = \frac{a}{2}, \quad y = \frac{b}{2}, \quad z = \frac{c}{2},$$

which is the required solution.

F. S.—AM is a median of the triangle ABC; AN bisects the angle BAC and meets BC in N; the perpendicular from B on AN meets AM in P. Show that PN is parallel to AB.

(Board of Education, Honours, 1908.)

Bisect the exterior angle at A by AN′, meeting BC in N′; then BP and AN′ are parallel.



Hence $$\frac{PM}{PA} = \frac{BM}{BN'} = \frac{BC}{2BN'}.$$

But $$\frac{BN'}{CN'} = \frac{BA}{AC}. \quad \therefore \frac{BN'}{BC} = \frac{BA}{BA - AC}.$$

$$\therefore \quad \frac{PM}{PA} = \frac{BA - AC}{2BA} = \frac{BN - NC}{2BN} = \frac{2MN}{2BN} = \frac{MN}{BN},$$

for $$\frac{BN}{NC} = \frac{BA}{AC}.$$

$$\therefore \quad \frac{PM}{PA} = \frac{MN}{BN}.$$

∴ PN is parallel to AB.

Brereton.—A quantity of gas is enclosed in a cylinder in which works a smooth, heavy piston. The axis of the cylinder is vertical. The piston is thrust down to compress the gas and then let go. Is the ensuing motion simple harmonic?

First put the piston down very slowly until the position of equilibrium is found. Let the length of enclosed gas then be h. Let A be the area of the piston, and W stand for the weight of the piston with the pressure of the atmosphere on it; hence W is constant.

Let P_0 be the pressure of the gas in the position of equilibrium, and P_x the pressure when the piston is thrust down a distance x from the position of equilibrium. Then

$$P_0 \cdot A = W,$$

and the force upwards on the piston, when at a distance x below the position of equilibrium, is

$$P_x \cdot A - W = (P_x - P_0) \cdot A.$$

By Boyle's law,

$$P_0 \cdot h = P_x \cdot (h - x).$$

$$\therefore \text{ this force} \quad = \left(\frac{h}{h - x} - 1\right) P_0 \cdot A$$

$$= \frac{x}{h - x} \cdot P_0 \cdot A,$$

which is not proportional to x, and the motion is not simple harmonic.

Augustus.—(i) Prove that the length of the n^{th} pedal of a loop of the curve $r^m = a^m \sin m\theta$ is

$$a(mn + 1) \int_0^{\frac{\pi}{m}} (\sin m\theta)^{\frac{mn - m + 1}{m}} \, d\theta.$$

(ii) Show that the length of a loop of the curve

$$3x^2y - y^3 = (x^2 + y^2)^3 \text{ is } 2 \int_0^1 \frac{dt}{\sqrt{1 - t^6}}.$$

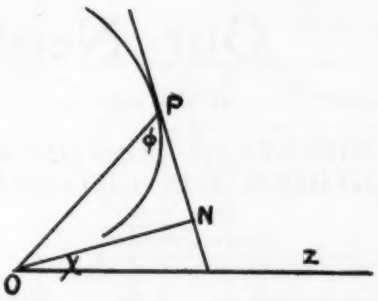
Since $$r^m = a^m \sin m\theta,$$

$$mr^{m-1} = ma^m \cos m\theta \cdot \frac{d\theta}{dr}.$$

Hence $$r \frac{d\theta}{dr} = \tan \phi = \tan m\theta;$$

that is, $$\phi = m\theta.$$

Now ϕ is the same for all the pedal curves at the corresponding points.



In the figure let $\angle NOZ = a_1$ and $ON = p_1$, and let the quantities a_2, p_2; a_3, p_3 . . . be the radii vectores and the co-ordinate angles for corresponding points on the 2nd, 3rd, etc., pedals.

Then $p_1 = r \sin \phi$, $p_2 = p_1 \sin \phi$, $p_3 = p_2 \sin \phi$, etc., and consequently $p_n = r \sin^n \phi = r \sin^n m\theta$.

Also

$$a_1 = \theta + \phi - \frac{\pi}{2}, \; a_2 = a_1 + \phi - \frac{\pi}{2}, \; a_3 = a_2 + \phi - \frac{\pi}{2}, \text{ etc.}$$

Thus $$a_n = \theta + n\phi - n\frac{\pi}{2}$$

$$= (mn + 1)\theta - n\frac{\pi}{2},$$

and $$da_n = (mn + 1)\, d\theta.$$

Now in the original curve r is zero when $\sin m\theta = 0$—that is, when $m\theta = k \cdot \pi$, so that a loop lies between $\theta = 0$ and $\theta = \frac{\pi}{m}$.

Now $$\frac{dp_n}{da_n} = \frac{dp_n}{(mn + 1)\, d\theta}$$

$$= \frac{1}{(mn + 1)} \left\{ \sin^n m\theta \cdot \frac{dr}{d\theta} + mnr \sin^{n-1} m\theta \cos m\theta \right\}$$

$$= \frac{r}{mn + 1} [\sin^n m\theta \cdot \cot \phi + mn \sin^{n-1} m\theta \cdot \cos m\theta]$$

$$= r \sin^{n-1} m\theta \cos m\theta.$$

$$\therefore \quad p_n^2 + \left(\frac{dp_n}{da_n}\right)^2 = (r \sin^{n-1} m\theta)^2.$$

$$\therefore \quad \frac{ds_n}{da_n} = \frac{1}{(mn + 1)} \cdot \frac{ds_n}{d\theta} = r \sin^{n-1} m\theta.$$

$$\therefore \quad s_n = (mn + 1)\, a \int_0^{\frac{\pi}{m}} (\sin m\theta)^{\frac{mn - m + 1}{m}} \cdot d\theta.$$

(ii) The equation of the curve in polars is

$$r^3 = \sin 3\theta,$$

and a loop lies between $\theta = 0$ and $\theta = \frac{\pi}{3}$; the loop is symmetrical about $\theta = \frac{\pi}{6}$. The limits for half a loop are therefore $r = 0$ and $r = 1$.

$$ds^2 = dr^2 + r^2 d\theta^2,$$

$$\frac{ds^2}{dr^2} = 1 + r^2 \cdot \frac{r^4}{\cos^2 3\theta} = 1 + \frac{r^6}{1 - r^6} = \frac{1}{1 - r^6}.$$

$$\therefore \quad s = \int_0^1 \frac{dr}{\sqrt{1 - r^6}}.$$

François.—Your query is bookwork. See Besant's *Hydromechanics*, § 123 and § 139, or any other advanced work on the subject.

The brightest book on Elementary Number Work.

PREPARATORY MATHEMATICS.

By A. Clement Jones, M.A., and C. H. Blomfield, M.A.

Price 1s. 6d.

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35 and 36 Paternoster Row, London.

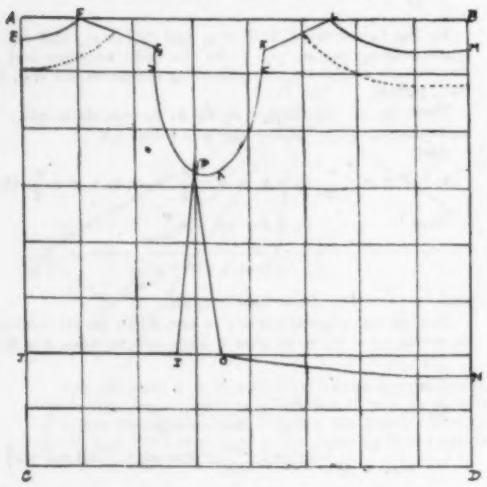
Our Needlework Column.

BY J. A. FLEMING, AUTHORESS OF "COMMON-SENSE NEEDLEWORK."

COMMON-SENSE COMFORTABLE CLOTHING FOR CHILDREN.

GIRL'S CAMISOLE.

(Twelve to fourteen years.)



20″ × 20″.

TAKE the measurement of the bust, plus 5″.
Cut a square of paper that size.
The pattern is 20″ by 20″.
Double it three times each way.
Mark the corners A, B, C, D.
Half the Back.—From A mark F ½ down.
From A mark E 1 in.
Draw a curve from E to F.
From A mark G 2½ in and ¼ down.
Join F and G by a straight line.
From A mark H 3 in and 2¾ down.
Draw a curve from G to H.
From C mark I 2⅜ in and 2 up.
Join I and H by a straight line.
From C mark J 2 up.
Half the Front.—From B mark K 3¾ in and ½ down.
From B mark L 2½ in.
Join K and L by a straight line.
From B mark M ½ down.
Draw a curve from L to M.
From D mark N 1⅜ up.
From D mark O 2 up and 4½ in.
Draw a curve from N to O.
From C mark P 5 in and 5¼ up.
Join O and P by a straight line.
Draw a curve from P to K.
Short Puff Sleeves.—(Diagram given last month.) Take an oblong of paper 12″ by 18″. Double it three times each way.
From A mark E 3 down.
From A mark F 2 in and ⅜ down.
From A mark G 5 in and ¼ down.
From B mark H 3¼ down and ½ in.
From B mark I 3 down.
Draw a double curve from G to I, passing through F, G, and H.
From D mark J 1⅞ up and ½ in.
Join J and I by a straight line.
From D mark K 3 in and 1½ up.
From C mark L 3 in and 1½ up.
From C mark M 2⅞ up and ½ in.
Draw a curve from J to M, passing through L and K.
Join M and E by a straight line.

Suitable materials—longcloth, calico, and madapolam. One and three-quarter yards 42″ wide would cut out two camisoles, but 1 yard will be required for one. According to one of the best French systems, the bands for a camisole, as well as for a chemise, may be cut *across* the material, instead of, as is usual, selvedge-way. Anyhow, as a matter of *economy* it would be wise to do that in this instance, as the band-length cannot be obtained selvedge-way without getting another ½ yard of material; ¼″ turnings should be allowed.

Lay the straight front to the selvedge and the straight back to a fold. It may be made high up the neck or as low as desired. The model was cut 1½″ lower than the neck-curve (the dotted line in the diagram) all the way round.

Make a 1″ hem on each side of the front. Run four ¼″ tucks on each side to face the front. The first one comes ½″ from the hem, and there should be the same distance between the tucks.

Make five or six buttonholes and fix buttons.

The buttonholes may be cut either lengthways or across. Vertical buttonholes are not so strong as horizontal ones, and the buttons slip out so easily that the

garment often comes unfastened. Still, sometimes it happens that the hem is not wide enough to allow them to be cut any other way.

Join the side seams and shoulder seams by a run-and-fell or a French seam.

If it is to be stitched by machining, a counter-hem would be employed.

The top may be finished off in several ways.

1. *By a Hem.*—This may be as narrow as possible. The right side would be embellished by feather-stitching.

2. *By Rolling and Whipping.*—Americans finish off many of their garments in this way, which is dainty and neat; but English housewives show a preference for a stronger finish, especially for children's garments, which require washing often.

3. *By a False Hem.*—This should also be *narrow*—not deeper than ¼″ when finished; and it is even more dainty if narrower still. The crossway strip is run on the right side and hemmed on the wrong side.

4. *Embroidery* having a plain piece of muslin is run on the right side and felled on the wrong.

5. Turn the raw edge down on the *right* side.

Tack over it a narrow beading, insertion, or feather galloon quite close to the edge.

It may be stitched top and bottom or hemmed only on the lower edge, when a narrow lace would be eased round the top, and the lace, insertion, and garment—all three—seamed together on the wrong side.

The lower edge of the camisole is set into a straight band ¾″ deep when finished.

It should be the waist measure plus 2½″ for turnings and wrap over. The model was 26″ by 2½″.

Sleeves.—Join these by the same kind of seam as the bodice. The notches show how far the gathering would extend, both top and bottom.

Gather, stroke, and fasten the gathering-thread with a pin until required. The band for the lower edge of the sleeve should be 9½″ by 2″, or a little over ½″ when finished.

Join and turn in the edges of the band. Crease it down the middle. Place the join to the sleeve join. The notches indicate how much is left plain on each side of the seam.

Arrange the gathers evenly, and tack and hem the band on the right side.

Turn the sleeve inside out, and tack and hem the band on the wrong side, making it lie easily without any twisting or stretching. The band should be finished off, like the top of the garment, with a fancy stitch or the feathered galloon. The notch under the armhole in the bodice shows where the sleeve seam comes. The notches at the top of the armhole show where the sleeve notches will come.

Pin the sleeve in position. Arrange the gathers, and tack the sleeve in its place.

Stitch the sleeve and garment together.

Bind a narrow crossway strip or fine tape over the raw edges, and hem on each side.

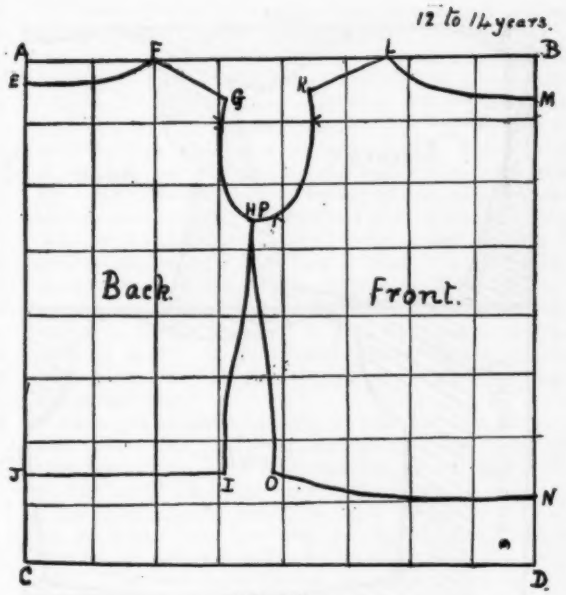
If lace finishes off the top, it should also be sewn round the sleeve with a little extra fullness.

Girl's Simple Blouse.

(Twelve to fourteen years.)

The model was made from white wincey striped with mauve, feather-stitched with D.M.C. "coton perle" No. 5; but any suitable fabric can be used. Along with wincey, viyella and flannel are most popular among schoolgirls for winter wear, and delaine, muslin, print, zephyr, and delainette for summer.

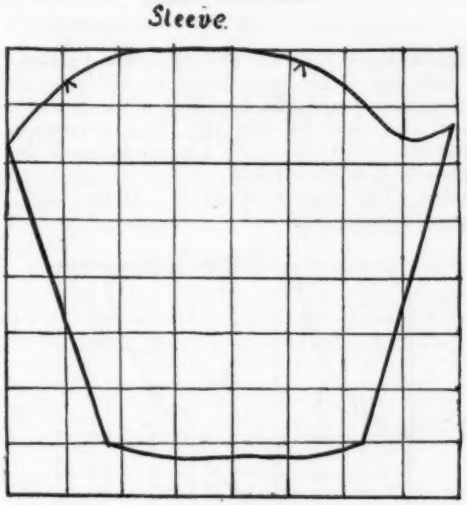
The blouse photographed is fastened down the back, but the pattern is equally adapted for fastening down the front. If the latter be desired, the straight back must be placed to a fold, and the fronts to the selvedge. The shape is the simplest that could be drafted, requiring only such stitches as are used in plain needlework, as it is not intended to enter the domain of dressmaking.



24″ × 24″.

To take Measures. 1. *Bust.*—Place an inch tape loosely round the fullest part of the figure high up under the arm.

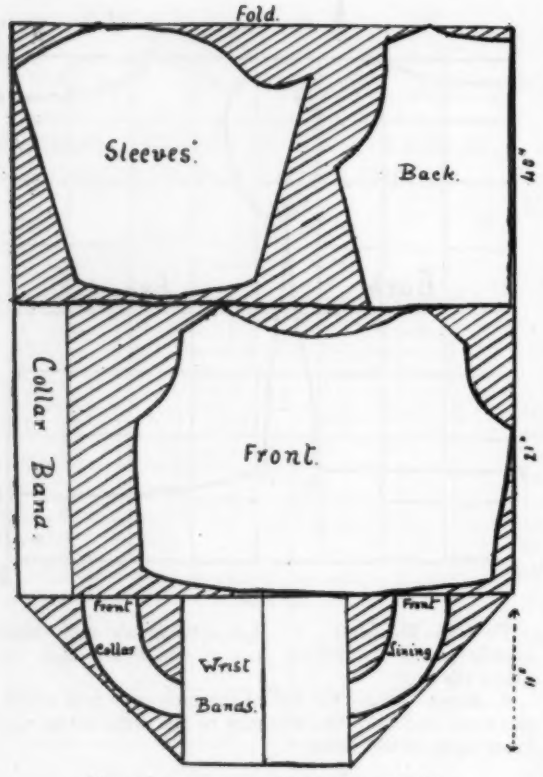
2. *Sleeve.*—Place the end of the inch tape well under the arm, and take the measure to the wrist along the inner seam of the sleeve.



20″ × 20″.

To Draft the Pattern.—Take a square of paper 24″ by 24″, or *half* the bust measure plus 9″. The drawing of the pattern in the squares is so simple that explanations are not needed. Having drafted half the front, it would be well to cut it out in double paper, so as to make it easier to plan out the material.

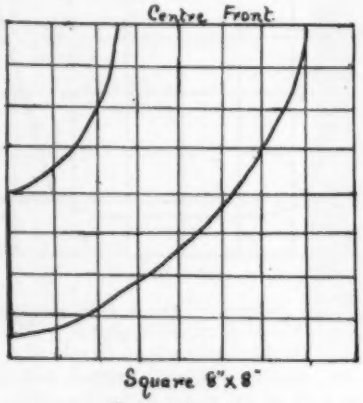
Sleeve.—The paper is 20″ by 20″, or the length of the inner seam plus 4½″. It is folded three times each way. The notches in the diagrams indicate how far the gathers will extend, and the places where the sleeve should fit into the blouse.



Planned out on 2 yds. of 36" wide material.

Wristbands.—These are 2½" deep when finished. To slip over the hands they should be 8½" wide, or the measurement round the knuckles when finished; to button, they need be only 7½". The material in the former case will be 9" by 5½"; in the latter, 8" by 5½", which will allow for turnings.

Collar.—The paper is 8" by 8". It is folded three times each way.



Blouse Collar.

Cutting out in Material.—Careful planning prevents waste in material, and makes for economy in buying. There is no excuse for a teacher who is used to making calculations being extravagant in this direction.

Two yards of 36" material should be enough. If the full width of the material be doubled over for a depth of 20", and the straight back placed to a selvedge at one side, the sleeves also can be got out of the width. The remaining length of the material is single, and the front, opened out the full width, can be cut from it. It will be noticed that *both* right and left edges of the sleeves are on the cross, and not, as in shirt sleeves, the one straight and the other cross. In order to make them set properly, the sleeve pattern must be laid on the material, as it is in the diagram, with the selvedge way coming straight down the middle. Plenty of material will be left for bands. The corners, as indicated, can be turned over to allow the collar and its lining (four pieces) to be cut on the cross.

Making up the Blouse.—The making of outer garments differs from the making of under garments in that no stitches, except those of the sewing-machine, should be seen on the right side. Consequently a run-and-fell or a seam-and-fell is never used.

All washing blouses, whether made up of cotton or woollen material, are joined by a French seam, which secures neatness both inside and outside.

To Work a French Seam.—Run or stitch the raw edges on the *right side*. Turn the garment inside out, and run or stitch the seam again so as to enclose the raw edges. No fringe or ravellings should be seen on the right side. To secure that, cut off all irregularities just above the first line of stitching; and be sure that, when tacking for the second row of stitching, sufficient room is allowed to infold all ravellings.

Make a 1" hem down each back, and run a ¾" tuck turned towards the back. Run one broad or two narrow tucks down the front in the form of a box-pleat, to make the neck the same size as the neck-band. As a rule, all tucks which turn *from* the front give apparent width to the figure, so that slim people do well to adopt them, while stout people will find that tucks turned *towards* the front take a little off the apparent width.

Make a ¾" hem round the bottom. Insert an elastic, and fasten the ends firmly, or insert a tape to tie at the back. A few stitches in the middle will keep the tape from coming out.

The hems and tucks may be stitched by machine or run by hand, as is found most convenient.

Make five or six buttonholes on the right-hand back, and sew the same number of pearl buttons on the left back.

It is sometimes a good plan to cover ordinary linen buttons with a circle of the material, to make the buttons match the blouse. Such are less likely to cut the stuff during their course through the wash-tub than are pearl buttons, but they do not fasten quite so easily.

Join the Sleeves.—Lay pleats or run gathers between the notches. If pleats are used, the two middle ones should face in opposite directions like a box-pleat. There should be the same number of pleats on each side. The same remark applies to the bottom of the sleeves, where 2" are left plain at each side of the seam.

Join the Wrist Bands.—Pin them in position, seam to seam, edge to edge, and right sides together, and then run or machine them on the right side, and turn over and hem on the wrong side. When stitched by machine, another row of stitching should be placed near the outer edge. The notches show where the sleeve will join the armhole. The notch under the arm in the blouse shows where the front sleeve seam will come. Stitch the sleeve and bodice together, and neaten by a crossway binding or by galloon.

Collar.—When cutting out in material, place the centre front of the pattern to the selvedge. Four pieces will be required, as the collar is double. Pin each half of the collar and lining together wrong side out. Run them ⅛″ from the edge all round except the neck curve. Turn each inside out, picking the corners out with the needle point. The collar may be decorated with feather or any other fancy stitch.

The Neck Band consists of two straight strips 14″ by 1¼″. Pin the *wider* ends of the collar (which come to the front) to the middle of one of the strips. The latter will extend 1¼″ beyond the ends of the former at the back, to allow for wrapping over. Pin the other strip or half of the neck-band to the back, so that the shaped collar comes between the two. Stitch all three together. Pin the middle of the neck-band to the middle front of the blouse. Pin the end of the neck-band to the outer edge of the blouse, making them meet exactly. Mark the quarters, and pin each to the shoulder seams. Stitch

these together. Turn over and hem the neck lining to the blouse. A horizontal buttonhole is worked on the neck-band, and a button sewn on the opposite end ¾″ from the end.

Answers to Correspondents.

St. Gabriels.—You gave no *nom de plume*, but I hope you will recognise mine for you. As the article on a "Girl's Simple Blouse" was partially prepared for a later number, I am able to insert it so as to answer your inquiries in as complete a form as possible.

I will quote fully from your letter, that other readers whose difficulties may be the same as your own may benefit at the same time.

"I teach Standards VI. and VII. in a large school, and, of course, find the needlework a large item. During the last term I taught the cutting out and making up of a pair of drawers, each child making and patching a small pair, and many making large ones for themselves. Next term I wish to teach the cutting out and making of a plain shirt blouse, and here is my difficulty. The only pattern I have is a very good one, and would fit the bigger girls; but what of the tiny ones? Should I make them all take the same size, and make one for their mothers? Or can you give me a good way of reducing the pattern to fit each child? I wondered if you had two or three sized patterns you could give me. My class is in a large room with no curtains, and as two lower classes are on each side, personal attention to each child's pattern would cause too much commotion or take too long a time. Then, again, in making up a blouse is it permissible to let children run and backstitch the seams, first on the right side, and then on the wrong? If not, what seams do you consider best? If this is troublesome to you, please forgive me, for I am most anxious to do the blouse in the best way."

Each girl should be taught to take her own measure and that of her neighbour, and each should make her own corrections. The class would make a normal draft, first 24″ by 24″, and then draw one to their own measures. Thus your difficulty would be easily overcome. Please let me know later how you get on. I should advise you to cut out and *make* two or three sizes first yourself. You will very quickly do that if you have a sewing-machine. I have two of Jones's machines in school, and they are splendid, both for making and mending garments.

Wishful.—I know of only three bodies in England that issue needlework diplomas.

1. The Training Schools of Domestic Science—Miss Cook superintendent. The Yorkshire Training School of Domestic Science, 90 Albion Street, Leeds, would be able to give you any information.

2. The City and Guilds of London Institute. The programme, published by Mr. John Murray, Albemarle Street, London (9d.), will give full particulars. They issue a *certificate*, the examinations for which are conducted at various centres throughout the country.

It includes (1) practical examination; (2) written examination; and (3) specimen work, which each candidate is required to complete, either in class or her own home during the six months preceding the examination. Fee, 2s. 6d.

3. The National Union of Teachers. A syllabus respecting teachers' diplomas in needlework and dressmaking can be obtained from Sir James Yoxall, M.A., Bolton House, Russell Square, London, W.C. The examination is held in March and October. Entrance fee, 2s. 6d. for each diploma.

The Unfolding of Personality as the Chief Aim in Education. By Thiselton Mark, M.A., B.Sc. (T. Fisher Unwin.)

Those of us who have read the other works of this talented author are not disappointed in this one. It is excellent. Mr. Thiselton Mark has made a deep study of the chief writers on philosophy and education, and in direct and simple language uses their conclusions, and his own keen insight into the character of the young, to develop an inquiry into the various innate tendencies which define the trend of human personality, and at the same time he presents a view of education which has the unfolding of personality as its central aim.

The illustrations and exercises at the end of the chapters are stimulating and helpful. This little book can be read and read again with pleasure and profit by the thoughtful teacher.

OUR TECHNICAL SCHOLARSHIPS.

DURING the past year the International Correspondence Schools, in conjunction with a large number of *Practical Teacher* subscribers, have initiated an educational movement the ultimate object of which is really nothing less than the betterment of the conditions of the general mass of wage earners of this country. Those teachers who have taken advantage of our offer of Free Technical Scholarships at the International Correspondence Schools can, without undue egotism, assure themselves that they are pioneers in an educational revolution which might fitly have as its watchword the pregnant words of Emerson, quoted at the Mansion House Conference, reported elsewhere in this issue :—

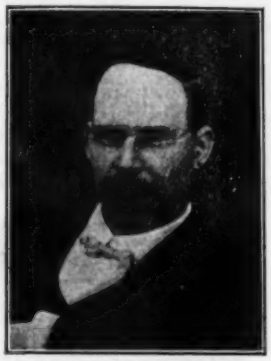
"*We must take the step from training to doing; we must teach the rising generation to do the things that the world wants done.*"

From the beginning of the school course the children of the future will be taught to use their hands, and to apply all the knowledge gained in school to practical modern uses; and when this great change has taken place, the International Correspondence Schools, along with the readers of this journal, will be able to point, with all due modesty, to the *Practical Teacher* Scholarship Scheme of 1911–12 as one of the prominent landmarks in the history of a great and far-reaching educational change.

It gives the Editor much pleasure to announce that the Scholarship Scheme now brought to a close has worked splendidly, and has had excellent results. The directors of the International Correspondence Schools report very warmly on the zeal, intelligence, and careful work of the teacher students; while the latter are full of praise for the unremitting attention paid to them by the tutors and officials of the I.C.S.

The encouragement afforded to the Schools by many prominent and far-seeing educationists is all the more remarkable when we consider that the organisation is entirely unofficial, and the result of the enterprise of private individuals who are showing the official directors of our educational system how the modern demand for up-to-date instruction can be most adequately met. Sir J. H. Yoxall has frankly associated himself with the work of the schools in his own constituency, while Mr. David M'Nally, M.A., organising secretary for secondary education under the Edinburgh School Board, recently emphasised in the following words a point which is often raised in connection with the work of the I.C.S. :—

"I would just like to say this, that I thoroughly agree that there is no manner of competition between the work undertaken by the International Correspondence Schools and the work done by the School Boards and other educational authorities. I believe that every successful effort that you put forth will favourably react on the continuation classes and on the technical colleges."



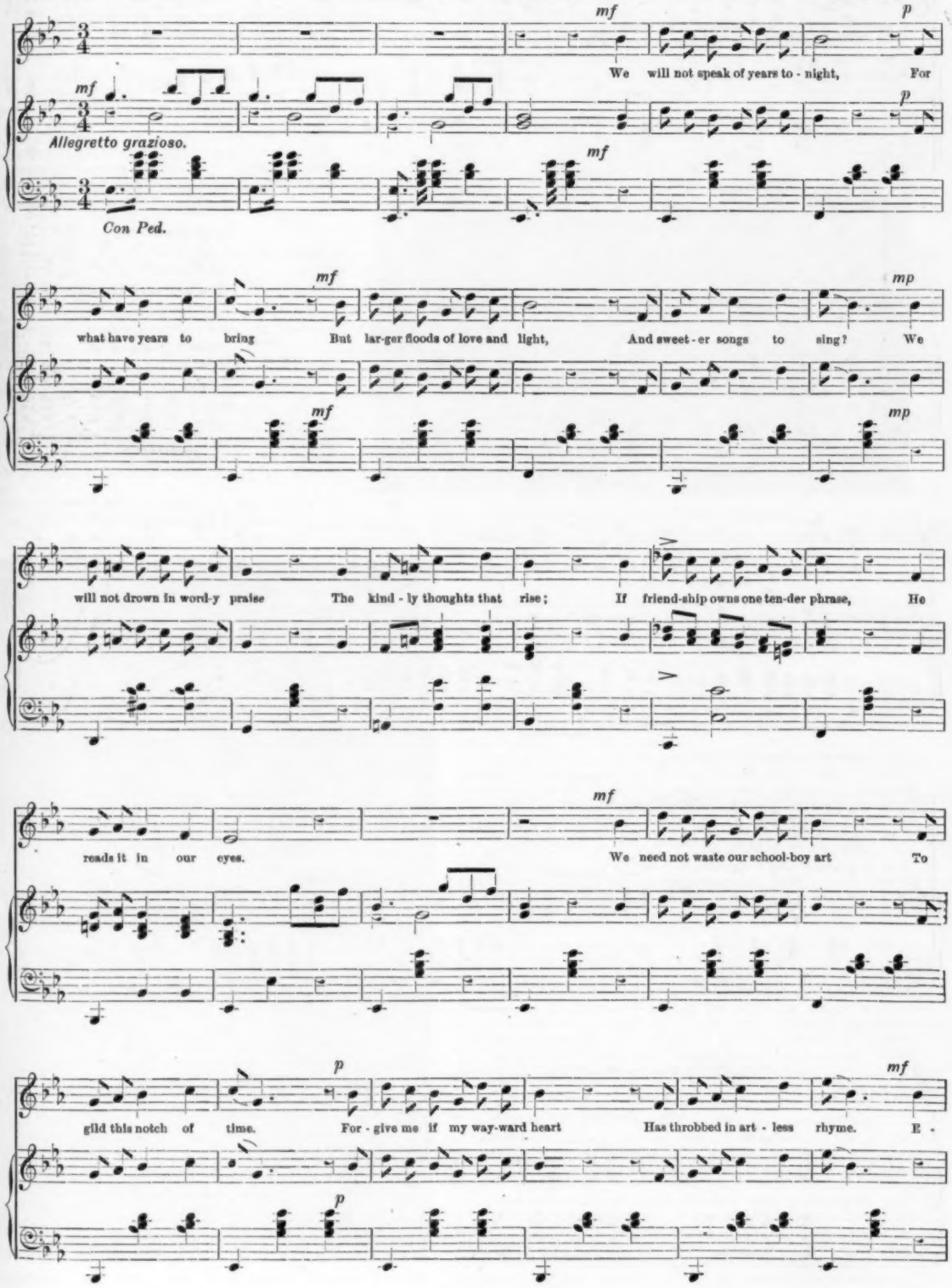
Mr. D. M'Nally, M.A.

Dr. Henry Dyer, vice-chairman of the School Board for Glasgow, has already borne testimony in these columns to the excellence of the work of the International Correspondence Schools, and to the recognised place which the institution has won in our educational system. This latter point was warmly emphasised by Professor Boyd Dawkins of Manchester University, who gave expression, some time ago, to the following opinion :

"What pleases me most is to see in this organisation a new force in education. There is no organisation that I know of anywhere in the world that brings the worker face to face with the need of technical education in the same way that this institution does. We both work in different fields within the great area of ignorance, and I believe that we are all—the universities, technical schools, and the like—fellow-workers attempting to do our best to improve mankind."

Opinions of educationists of such high rank will, naturally, weigh heavily with those of our readers whom the *Practical Teacher* has been the means of introducing to the work of the International Correspondence Schools. It is the earnest hope of the Editor of this magazine that students who have benefited by the generosity of the directors of the institution will show their appreciation by making still more widely known the work that is going on in a sphere of educational effort which has never yet been exploited in this country by any organised body of educational workers.

A FRIEND'S BIRTHDAY.

Words by O. W. HOLMES. *Music by* F. H. SQUIRES, F.R.C.O.

mf
We will not speak of years to - night, For
p
mf
Allegretto grazioso.
Con Ped.
mf
what have years to bring But lar-ger floods of love and light, And sweet - er songs to sing? We
mp
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mp
will not drown in word-y praise The kind - ly thoughts that rise; If friend-ship owns one ten-der phrase, He
reads it in our eyes.
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We need not waste our school-boy art To
gild this notch of time.
p
For - give me if my way-ward heart Has throbbed in art - less rhyme. E -
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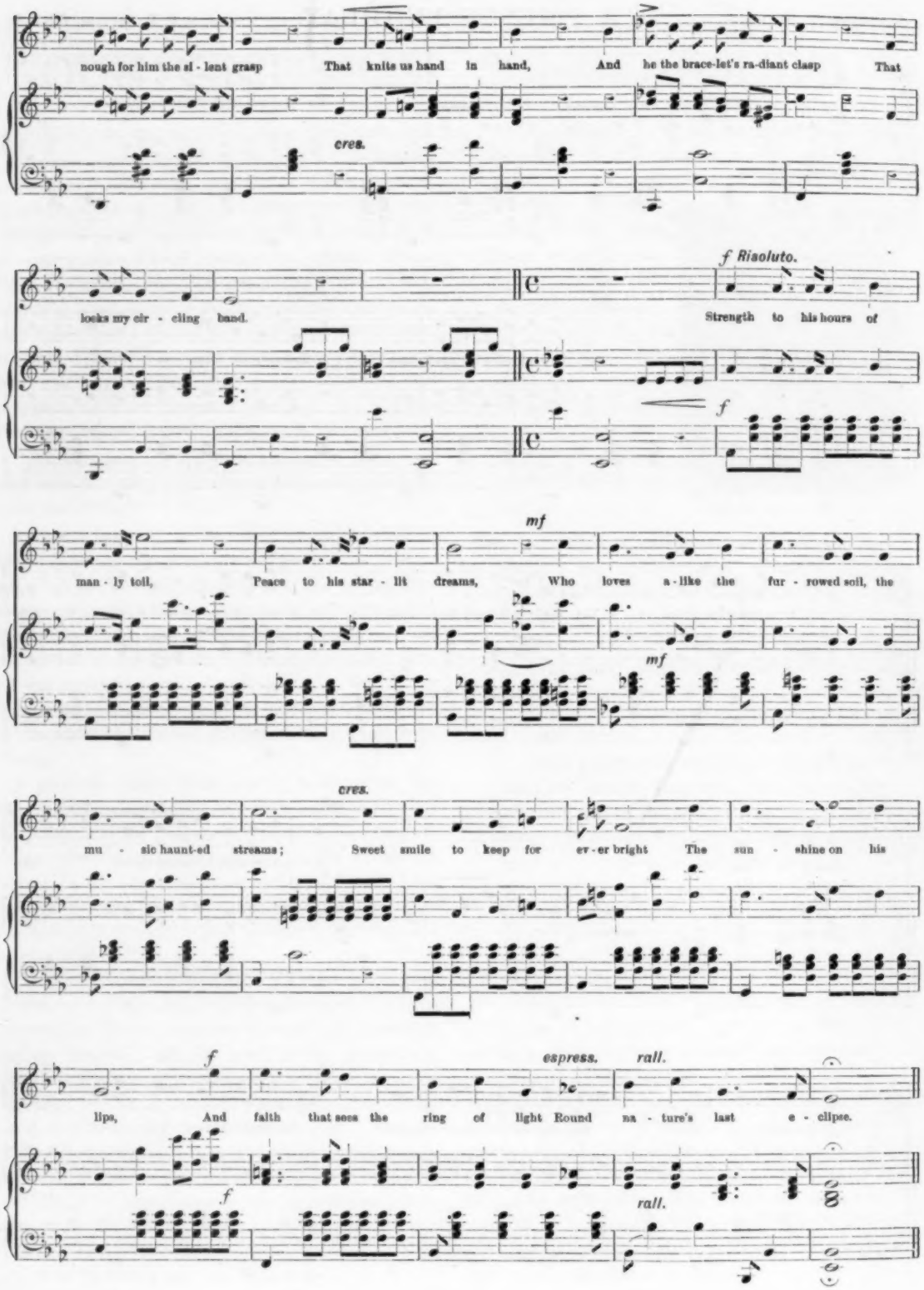
nough for him the si - lent grasp That knits us hand in hand, And he the brace-let's ra-diant clasp That
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looks my cir - cling band. Strength to his hours of
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man - ly toil, Peace to his star - lit dreams, Who loves a - like the fur - rowed soil, the
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mu - sic haunt-ed streams; Sweet smile to keep for ev - er bright The sun - shine on his
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lips, And faith that sees the ring of light Round na - ture's last e - clipse.
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PRACTICAL NOTES ON SCHOOL GARDENING FOR APRIL.

BY BRUCE COOK, F.R.H.S., CHINGFORD.

ON no account attempt to get on the land, especially if a clayey soil, when the ground is very wet. This is most important. Far better postpone the gardening lesson for a day or so. Such action is recommended by the Board of Education in their latest "Suggestions for the Teaching of Gardening," which states: "The teachers must exercise discretion in varying the time-table to suit the weather. There are times when the garden should not be touched."

Vegetable Culture.

Turnips may be sown in rows or drills 16″ apart and 1″ in depth. Aim at quick growth. To prevent the attack of the turnip fly, dust soot or Clay's fertilizer over the drills.

Radishes should be sown in drills, not broadcast. They require similar treatment to turnips; only the drills should be ½″ deep and 3″ apart.

Peas should be sown as recommended in the notes in April last.

Parsnips can also be sown. They should be put in at once, as it is getting late to sow them.

Carrots should be sown towards the end of the month. They do best on light, deep soils. On shallow clay soils grow the short stump-rooted variety; while on deep soils grow Red Surrey or Altringham.

Potatoes should all be planted by the end of the month. Early kinds in drills 2 feet apart, 6″ deep, 10″ from set to set. Late varieties should have 3 feet between the rows, 6″ deep, and 18″ between the sets. See notes in last number of the *Practical Teacher*.

Herbs should be grown in the general plot. The following at least should be grown: mint, parsley, sage, and thyme.

Tomato, celery, and *marrow* seeds may be in pots early in the month, and raised in a greenhouse, frame, or sunny window. Seeds of *stocks, asters*, etc., may be raised in a similar manner.

A Practical Lesson on "Hardy Plants."

A Lesson on the Advantage of Sowing a Scarlet Runner Seed in the Right Position.

These should be pricked out when large enough. Take care, however, to protect them from the frost.

Flower Culture.

Sweet-peas should be watched and protected from the birds. The best way to keep them from the birds is to stretch *black* cotton over the rows on sticks. Say you put the rows of cotton 3″ above the soil, and from 2″ to 3″ apart, and tie the cotton on sticks put in at the ends of the rows.

Hardy Flowers.—Clumps of these may be divided with a sharp knife, and replanted in rich, deeply-worked soil.

Annuals of all kinds do well if sown in the open in April. Grow plenty of nasturtiums, as they bloom freely, and the flowers come in for the brushwork lesson.

Pruning of Roses.—Finish pruning all hybrid perpetuals, both standards and bushes, by the end of the first week in April. Cut well back to a dormant bud pointing outwards. Also cut away any thin branches, for the best blooms are always produced in young thick growths. Any teas or hybrid teas should be pruned about the second week in April. If sécateurs are used for pruning, see that the blade is sharp, otherwise you bruise the end of the stem. Look over the briers that were budded in July and August, and rub off any buds breaking out from the side of the brier, as this sends all the sap into the bud or buds that have taken. These may be tied to thin sticks to prevent the growths from being blown out in windy weather.

Herbaceous borders should be finished by the second week in April. If you have purchased the roots from a distance, unpack them in front of the lads, and explain the different varieties to them. Stand their roots in water for a short time. When planting in the prepared border, see that the taller varieties are put at the back; and do not crowd, as most of the hardy plants quickly extend in growth. Plant if possible on a fine day, when the surface soil is dry, and carefully label each plant. After planting, mulch with short manure, after watering.

Fruit Culture.

Strawberries and *raspberries* may be weeded and mulched.

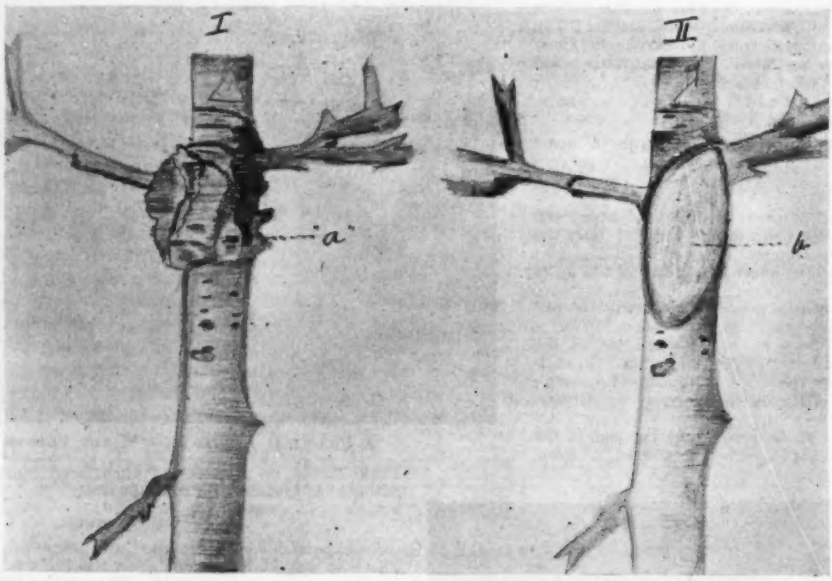
Gooseberry bushes should be dusted with soot or lime, as this keeps away birds and other pests.

All *grafting*, etc., should be finished by the end of the first week in this month.

Canker.—Several correspondents have written during the past month on the question of the treatment of canker on their fruit trees. There can be no doubt that canker is brought about by a fungus which readily attacks any damaged branches or roots of fruit trees. It also seems to flourish on certain weak growing varieties of apples, particularly on fruit trees planted on damp undrained soils. Sometimes a branch becomes bruised by rub-

bing against another branch, and then canker soon makes its appearance. But on clean, healthy, firm wood canker fungus does not seem able to make much impression. If neglected it makes rapid headway, killing the bark and the wood also.

As to treatment, some recommend winter spraying, and this may be the means of checking the spread of the fungus. As soon as diseased patches appear, carefully cut away the branch and burn it. Or if the branch contains some likely growths, with fruit buds and spurs, and is only slightly attacked, try the following. First cut away the diseased patch, taking care to burn the pieces, and then take an old brush and dip it in some tar—Stockholm for preference—and paint the part of the branch from which you have cut the diseased portion. This sometimes checks the disease, especially when in the early stages of the attack. If the tree is badly infested, cut it down to within a short distance of the soil. Do this not later than the middle of April, and on the new growths that appear bud some other stronger variety of apple. This may be done in July or August.



In the above diagrams, I. is the diseased branch of an apple tree showing "canker" at "*a*," while II. shows the same branch with the "cankered part" cut away at *b*, and treated as recommended in these notes.

A Lesson on a Runner Bean Seed.

Obtain some runner bean seeds, and give one to each lad, and let them examine them as to size, etc. Soak them in water in a white bulb glass. Use a white one, as you can then more easily watch the beans. Then stand these in a light window sill inside the window. After a day or so they will begin to wrinkle as at *b*, and then swell as at *c*. On taking them out, if you carefully

Runner Bean (Natural Size).

notice just above one end of the scar you will find a very small hole in the coat of the seed; and that, if you squeeze the swollen bean between the finger and thumb, bubbles and water will come out of this hole. Note this carefully, as it is through this hole that the root of the young plant comes. Now remove the covering of skin, which can easily be peeled off, and then split open the seed as shown at *d*.

Between the two pieces of the bean seed (really seed leaves), and affixed to one of them, will be found the root at R and the bud at B. Let each scholar take one of the swollen beans, and after similar treatment examine under the microscope, or even with the naked eye, and draw same.

Then plant two ordinary bean seeds in a chalk box standing on one end filled with good soil to within an inch of the top. Part of the top end of the box should be cut away to permit of growth. In the place of the lid of the box, and along the groove, slide a piece of glass cut to the same shape and size as the lid, and push the seeds close up against the glass. Note that if the seed is placed with the scar downwards the growth is not so quick as if the seed had been placed in a similar position, as in C of the diagram. Watch the growth. The root in time will be seen to emerge and descend to the bottom of the box, and the bud to grow upwards. Explain how the young plant feeds upon the two seed leaves. It is really wonderful how interested the scholars are in the process, and how eager they are day by day to inspect the box and its contents!

In the photo of the two runner beans growing in the chalk box as explained, you will notice that the one planted with the scar downwards has hardly started to grow, while the one planted "end on" has made good growth, although both were planted at the same time and received the same treatment. Ask the lads to explain why.

Answers to Correspondents.

Anxious.—I should say that the seeds were bad; or did they rot through being overwatered?

Miss K.—Yes; at any rate you can try, and let me know result.

Beginner, Corris, Jeffery, and D. P.—A scheme appeared in the January number of this journal.

Mr. M.—No; the examination is not difficult. Look in the advertisement pages of the *Schoolmaster*. You will find at least two who coach for the examination by correspondence.

Trilby and West Country.—Obtain suggestions for the "Teaching of Gardening." You can get it from Whyman and Son, Fetter Lane, E.C. Price, 1d. Do not attempt all, at any rate for a year or so.

G. N., L. A. W.—See back numbers of the *Practical Teacher*.

James.—You cannot expect answers to all the questions. Take in a good gardening paper, and look up the back numbers of the *Practical Teacher*.

Sweet-pea, Ivo, and W. K.—If you cannot obtain Clay's manure locally, write to Clay and Son, Stratford, E. There are many artificial manures, but from experience I can recommend this one.

Nettle.—Gamage's of Holborn can supply all that you want. Write for catalogue.

Other correspondents are recommended to obtain back numbers of the *Practical Teacher*, and consult Notes on Gardening.

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THE proprietors of this journal are particularly anxious that no distinctive talent among its readers should remain hidden and unrecognised for lack of such help and encouragement as a paper like the *Practical Teacher* can afford. With the aid of the International Correspondence Schools, they have recently been the means of helping a large number of teachers who wish to prepare themselves for imminent changes in the curriculum of our schools, and hundreds of progressive educationists can now testify to the excellence of the instruction imparted by the above-named institution. It is now the turn of those teachers who possess the pen of the ready writer, but have no taste for technical subjects, and the following scheme has been devised for their particular benefit.

Teacher Novelists.

A cynic remarked a short time ago that teachers ought to be adepts at fiction, seeing that they include history in their subjects of instruction! Be this as it may, the fact remains that some of our best writers of fiction have been, directly or indirectly, connected with the profession. There are other mute, inglorious Yoxalls waiting to be discovered, and we mean to find them out if possible. We shall not for the present, however, venture upon a complete novel, but shall begin with the short story.

Our Offer.

We offer a prize of Five Guineas for the best short story written by a teacher. Competitors must be acting members of the profession, engaged in regular instruction in a recognised school within the Empire.

The story must contain not less than 2,000 and not more than 4,000 words. The subject is immaterial. Competitors may send in :—

1. Love stories.
2. Loveless stories.
3. Stories *of* children.
4. Stories *for* children.

The latest date for sending in MS., which must be typed, is April 30. The result of the competition will be announced in the issue of the *Practical Teacher* to be published on May 25.

A prize of three guineas is offered for the story adjudged to be second in order of merit, and a prize of two guineas for the story taking third place.

The three winning stories will be published in the June and July issues of the *Practical Teacher*.

A Real Opportunity.

Teachers are hereby informed that the Editor of this journal wishes to discover really capable writers of short stories, with a view to offering them work in other directions, in connection with the publication of books for young people. A word to the wise is sufficient. Some writers find it a help to be provided with a picture which will assist the imagination, and the process of writing up to an illustration of this kind is in itself highly interesting. We therefore printed four pictures on page 628 of last month's issue, any one of which can be used, *if the competitor wishes*, for this purpose. This matter is, however, left entirely to the writer's option, and stories written up to these particular illustrations will be judged solely upon their intrinsic merits.

Rules to be Observed.

The first sheet of each competitor's MS. must bear the following particulars, clearly set forth, and nothing else must appear on this covering sheet. (If this rule is not observed, the competitor will be disqualified.)

1. Competitor's full name (lady to state whether Mrs. or Miss) and professional status.
2. Name of school.
3. Competitor's private address.

On this covering sheet must also be gummed or pasted the coupon cut from the back cover of the *Practical Teacher* for March and April respectively. Envelopes must be endorsed "*Practical Teacher* Literary Competition."

A Request.

Regular readers of the *Practical Teacher* who do not care to enter for this competition are asked to make it known to friends who are not yet subscribers to this journal. The contest will be very strictly confined to the teaching profession, in order to give a real opportunity to literary aspirants who have not yet appeared in print.

It must be distinctly understood that the copyright of each story sent in becomes the property of the proprietors of the *Practical Teacher*, and that the decision of the Editor in the matter of adjudgment is final. No correspondence can be entered into regarding the merits or demerits of the stories selected for award.

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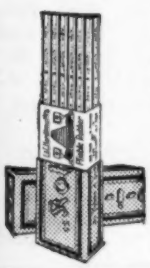

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The MARCH number of THE JOURNAL OF EDUCATION is the Five-Hundredth issue. It contains the following Articles of note:—

Editorial; Education According to Tolstoy, by Prof. M. E. Sadler; The Training College of the Future, by Prof. John Adams; The Study of Education: A Forecast, by Prof. J. J. Findlay; Notes on Girls' Education, by Arthur Sidgwick; Modern Languages Holiday Courses, by E. J. Notcutt; The English Association Meeting; The Moral Education League; Settlement Work; Etc.

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Papers for Teachers of Infants.

A TALE FOR THE STORY HOUR.

HOW TSIETSE FOUND HIS FATHER.

A Basuto Fairy Tale.

BY MARIE BAYNE.

LITTLE Tsietse felt very sad, although he was but seven years of age.

His black eyes were not merry and bright like those of the other boys. He no longer cared to run and play with them, nor even to ride astride the goats in the village. Instead, he would steal away from every one, and wander far into the forest.

There he would sit by the side of some willow pond, and with his knees drawn up to his chin and his brown hands around them, he would think and think till his woolly black head was weary.

Now what was little Tsietse thinking about? I will tell you. Every day he was asking the trees and the sky and the birds a question, and the question was this, "Where is Tsietse's father?"

All the other boys and girls in the village had fathers who loved them—tall men who, when they came home from the millet fields, would take their sons up in their arms and caress and pet them.

But no father ever came home at sundown to Tsietse. He and Takane, his mother, lived alone in their hut; and Takane's eyes were as sad-looking as Tsietse's own.

Yet Tsietse felt sure that his father was not dead, for none in the village called Tsietse's mother a widow. Where, oh where could he be?

At length one day he made up his mind to ask Takane the question, and Takane answered him,—

"My son, a father you have never known, because the Evil Spirit of the Waters carried him from amongst us before you were born."

"And where is he now, my mother?" asked Tsietse.

"That I cannot tell," said Takane, "for we know not into which pool he was drawn. Many oxen and sheep have we driven into the pools in search of him (for they alone can bring him back); but as they did not return, we know that he is not near."

"And are they dead—these oxen and sheep?" asked Tsietse.

"Nay," said Takane sharply; "nor is your father dead, my son."

"Then will he return some day?" asked Tsietse.

But Takane shook her head. "We know not where to search for him," she answered.

From that hour little Tsietse resolved that he would find his father.

He went to a pond which lay a long way off, and asked the frogs to help him; and at last one old frog hopped close to him and said,—

"He is not here, O Tsietse! You will find your father only if you walk to the very edge of the world. Much water is there, and it is very salt and deep; but when you have leaped into it you shall have your wish."

Then Tsietse was glad. Running back to the village, he met two other boys, and told them all the wise frog's words. "Lo," said they, "we will go with you!" So, armed with their assegais (spears), the three boys set out.

They came to the pool, which lay a long way off, and again the frog spoke with Tsietse. "Only if you go alone, O Tsietse," said the frog, "will you find your father!"

So little Tsietse bade farewell to his friends. Ere he went on he stuck his spear into the ground. "Tarry here by it," said he, "until I return. If it stand steady, I am safe; if it shake, know that I am in peril; if it fall to the ground, I am dead, and you must bear the sad tidings to my mother."

All alone through the deep, dark forests went Tsietse. A tiger chased him, and he would have lost his life had not the frog again come to his aid. Hopping from a pool, it looked up at him with round, sad eyes.

"Sit on this stone," croaked the frog; and when Tsietse did so, the stone swelled into a giant rock.

All night long the tiger wandered restlessly around it, switching his tail and snarling with hungry voice. But Tsietse sat safely on the top of the rock, and at last the tiger went away.

On and on went Tsietse, and by-and-by he came to the great salt sea. It looked very big and strange, but Tsietse was not afraid. "Where is my father?" he cried, stepping into its waters; and as he asked the question, the sea rose and rose till it covered his head, and he was seen no more.

Yet Tsietse was not dead—oh no! For a long time he sank down, down, down into the great salt sea; but at length he found himself in a green and pleasant country. Here were fruit and flowers, maize and corn, sheep and oxen; and these last seemed to Tsietse strangely like those he had seen at home.

Many boys were herding the cattle, and Tsietse asked each in turn if he had seen his father.

"Nay," said they, shaking their heads; "but you must ask our chief."

When Tsietse had found the chief he told his story; whereupon the old chief began to mutter to himself. "This," said he, "must be the son of the Great Snake whom the Water Spirit sent here long ago!"

Now, when Tsietse first heard that his father was a snake he was filled with horror. But after a while love and pity overcame his fears, and when the Great Snake appeared he embraced him gently.

Then the heart of the Snake beat high with hope, for he knew that with Tsietse's aid he might become a man once more.

Together he and his son came up through the great salt sea to the earth. Then, however, Tsietse ran on before, that he might warn his mother.

On the way he passed the spot where he had stuck his spear, and, behold, it stood there still! But the friends of Tsietse were no longer there. "Ho!" thought he, "the friends of Tsietse were not true!" He did not guess how many years had gone by since he had stuck his spear into the ground, for days and years pass like moments under the sea!

When Tsietse left home he had been a little boy; when he returned he was a tall and handsome man. Very gently he told his mother all that had happened to him, and when Takane heard it she was full of joy. Calling an old witch doctor, they sought counsel of him, and he told them what they must do.

"To-morrow," said he to Tsietse, "you must bring

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your father to the village. But he must not come alone. All creatures which were sent in search of him must bear him company. And see to it that no glance save theirs be cast upon the Snake!"

Then Tsietse went back to meet the Snake, his father; and as they returned to the village, lo! from every pool sheep and oxen came towards them, bleating and lowing.

So the Great Snake crawled along the ground with his tall son by his side, and all around them went the cattle. Behind and before, to right and to left, they walked, so that no eye save theirs saw that which was within their midst.

When they came to the village, the witch doctor stood upon the threshold of Takane's house (but Takane was not there). He bade the Snake enter, and then, seizing a lighted brand, set the hut on fire.

All the people, and even Tsietse, cried out in horror; but the witch doctor only smiled. "Peace, my children!" said he. "Lo, it is only by fire that the Water Spirit is conquered!"

Then all the people stood still, and when the fire was spent, and the hut in ruins, they saw in the midst of the ashes a round skin ball. This the witch doctor threw into a pool close by, and, behold, from the water rose Tsietse's long-lost father! He was clad in a "kaross" (cloak) lined with thick, soft fur, and bore in his hand a club of shining black; so black and hard and shining was this club that every man in the village looked at it with envy.

Then a glad, soft light came back into Takane's eyes, and Tsietse, her son, no longer looked sad, but merry. Ever since that time, when they sit by the fire at nights, the people of the village tell their little ones how Tsietse found his father.

SCRIPTURE LESSONS FOR YOUNG CHILDREN.

THE STORY OF JESUS—*Continued.*

BY MRS. FLORENCE KIRK.

1. The Ministry of Jesus: Jesus at the Well.

WHEN the Feast of the Passover was ended, and the courts of the Temple were no longer filled by crowds of worshippers, Jesus and His friends decided to leave Jerusalem. He did not return at once to Galilee, but spent some time on the banks of the river Jordan, preaching to the people, and while in that neighbourhood gained many new followers. These were then baptized by His first disciples, after the manner of John the Baptist, who was still preaching, but had gone to another part of the country.

After making another visit to Jerusalem He set out on the way to Galilee, accompanied by a small party of His friends who also came from that district. (Reference should here be made to the mode of travelling in parties for safety.) Jesus and His friends were obliged to make the journey on foot, as they were not rich enough to afford camels or donkeys. They did not take the usual route, which went east of the river Jordan, but, leaving Jerusalem by the northern gate—sometimes called the Gate of Damascus (Damascus being at that time a very important centre of commerce)—they followed a track which led them over the hilly country towards Samaria. (Here refer to the sketch-map, and indicate the three divisions of the country.)

Reference should also be made to the unfriendly relations of the Samaritans and the Jews. Although belonging originally to the same race, they differed on some points of religion. The Jews regarded the Temple at Jerusalem as the only place where sacrifices could be acceptably offered; but to this the Samaritans would not agree, and built a temple for themselves on Mount Gerizim. The result was that they became very bitter enemies, and showed their ill-feeling in many ways.

Jesus knew this, and seems to have tried to bring about a better state of feeling between them; hence His desire to travel by the road leading through Samaria. (The teacher should here try to paint a word picture of the country and the occupations of its inhabitants. Any views or other pictures should be introduced, and the route followed on the sketch-map.)

After leaving the barren, rocky country round about Jerusalem, Jesus and His fellow-travellers entered a more fertile district, with cornfields, meadows full of sheep, olive groves, and gardens of fig-trees and vines. About noon of the third day they approached the old city of Sychar (now known as Shechem), the capital of Samaria, about 40 miles from Jerusalem.

Near the entrance to the city, and close to the roadside, was a deep well of clear and pure water. It was called the Well of Jacob, because it was believed that the patriarch Jacob had dug it many hundred years before to water his flocks and herds when pasturing in that neighbourhood. This was also supposed to be the spot where Joseph's brothers were minding their flocks when he was sent with a message by his father, and where they sold him to the passing Ishmaelites. Near this spot Joshua assembled the tribes of Israel after their entry into the Promised Land, and read to them the law that had been given to Moses on Mount Sinai.

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surrounded by a low wall to prevent cattle from falling into it, and also to keep it clear from stones and sand. Near it was a large stone trough into which water could be poured, so that the thirsty animals could drink; and the wooden roof served as a protection from the sun's rays.

Jesus, being tired with the journey, sat upon the low wall of the well to rest while the disciples went into the city to buy food. (Here show the picture, and call attention to the hilly situation of the city, the flat roofs of the houses, the Temple in the distance with its dome and tower, the cloudless blue sky, etc.) While Jesus was resting, a woman came from the city to draw water for her household, carrying her pitcher on her head. As she came up to the well, she lifted it off her head and let it down by the long rope fastened to the side of the well.

When she had drawn the water, Jesus asked her to let Him drink from her pitcher. She seemed greatly surprised that He should speak to her, for she saw that He was not a Samaritan, and assumed—probably from His dress and speech—that He was a Jew; for she said, after giving Him what He asked, "How is it that

JESUS AT THE WELL.
(From Nelson's Bible Wall-Pictures.)

thou, being a Jew, askest drink of me, which am a woman of Samaria?" Jesus said to her, gravely but kindly, "If thou hadst known who it is that asketh thee, thou wouldst ask of him, and he would give thee living water." She replied, "Sir, thou hast nothing to draw with, and the well is deep. How wouldst thou get this living water? Art thou greater than our father Jacob, who gave us this well, and drank thereof himself, and his children and his cattle?"

Jesus continued speaking in figurative language, as His manner was, drawing His illustrations from the familiar surroundings. He said to her, "Whoso drinketh of this water shall thirst again; but whosoever drinketh of the water that I shall give him shall never thirst; but the water that I shall give him shall be in him a well of water springing up into everlasting life." The woman, thinking He spoke of water like that in her pitcher, said, "Sir, give me this water, that I thirst not, neither come hither to draw." Jesus then dropped this way of speaking, which seemed to puzzle her, and told her to fetch her husband. She replied that she had not a husband, and then Jesus told her that she had had five husbands.

The woman then saw that she was talking to an uncommon person, for an ordinary stranger could not know what Jesus seemed to know; and she replied, "Sir, I perceive that thou art a prophet. Our fathers worshipped in this mountain, and ye say that in Jerusalem is the place where men ought to worship." Here she pointed to Mount Gerizim in the distance.

Jesus replied, "Woman, believe me, the hour cometh, when ye shall neither in this mountain, nor yet at Jerusalem, worship the Father. But the hour cometh, and now is, when the true worshippers shall worship the Father in spirit and in truth. God is a Spirit: and they that worship him must worship him in spirit and in truth."

The woman could hardly understand all this, but she replied, "I know that the Messiah is coming which is called Christ: and when he is come, he will tell us all things." Then Jesus said to her, "I that speak unto thee am he." Here they were interrupted by the return of the disciples from the city. The woman, leaving her waterpot at the well, went back to the city and told all the people she met what a wonderful person she had encountered at the Well of Jacob, saying: "Come and see a man who told me all things that ever I did. Must not this be the Christ?" The people of Sychar then flocked to the well where Jesus and His companions were sitting.

While she was away the disciples pressed Jesus to eat, for they were all hungry with their journey. As He sat down with them on the ground, He said to them, speaking in figurative language again, "I have meat to eat that ye know not of." Then the disciples wondered, and asked who could have brought some while they were away in the city. But Jesus continued, "My meat is to do the will of Him that sent me, and to finish His work."

He went on talking in this way until the Samaritans arrived. And they begged Him to come into the city and remain with them for some days. This He did, and during His visit spoke to them of many great things. And when He left them on the morning of the third day, many of them acknowledged Him to be the Christ, and enrolled themselves as His disciples.

"O Thou to whom, in ancient time,
The lyre of Hebrew bards was strung;
Whom kings adored in song sublime,
And prophets praised with glowing tongue!

"Not now on Zion's height alone
The favoured worshipper may dwell;
Nor where, at sultry noon, Thy Son
Sat weary by the patriarch's well.

"From every place below the skies
The grateful song, the fervent prayer,
The incense of the heart, may rise
To heaven, and find acceptance there.

"To Thee shall age, with snowy hair,
And strength and beauty, bend the knee;
And childhood lisp, with reverent air,
Its praises and its prayers to Thee.

"O Thou to whom, in ancient time,
The lyre of prophet bards was strung,
To Thee at last, in every clime,
Shall temples rise and praise be sung."

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1. All French translations **must be received not later than April 7, 1911,** and addressed to:—PRIZE EDITOR, Office of *The Practical Teacher*, 35 and 36 Paternoster Row, London, E.C.
2. Competitors should cut out and send the *coupon* which appears on the Back Wrapper page of the current number. One coupon must be sent for each entry.
3. Competitors should write pseudonym only on MS. Prize-winner will be asked to send name and address for publication.
4. No competitor may take the prize offered more than once in three months.

A Prize of **Half a Guinea** is offered for the best rendering into English of the following extract:—

Cette méthode un peu sophistique à laquelle Socrate lui-même ne me paraît pas avoir entièrement échappé, fut un des travers de jeunesse de Franklin ; il s'en guérit peu à peu, se bornant à garder volontiers dans l'expression de sa pensée la forme dubitative et à éviter l'apparence dogmatique. Il avait beaucoup réfléchi sur la manière de prendre les hommes dans leur propre intérêt, et il avait reconnu qu'il ne faut pas pour cela sembler trop certain et trop assuré de son opinion ; les hommes agréent plus aisément et consentent mieux à recevoir de vous ce qu'ils peuvent croire avoir trouvé en partie eux-mêmes. Montesquieu, dans les *Lettres Persanes*, a parlé d'un de ces personnages au ton tranchant et absolu comme nous en connaissons encore : "Je me trouvai l'autre jour, écrit Rica à Usbek, dans une compagnie où je vis un homme bien content de lui. Dans un quart d'heure il décida trois questions de morale, quatre problèmes historiques, et cinq points de physique. Je n'ai jamais vu un *décisionnaire* si universel."

Franklin était tout le contraire de cet homme-là ; il avait fini par supprimer dans son vocabulaire ces mots *certainement, indubitablement :* "J'adoptai en place, dit-il, *je conçois, je présume, j'imagine* que telle chose est ainsi ou ainsi ; ou bien *Cela me paraît ainsi quant à présent.* Lorsqu'un autre avançait quelque chose que je croyais une erreur, je me refusais à moi-même le plaisir de le contredire brusquement et de démontrer à l'instant quelque absurdité dans sa proposition ; et, en répondant, je commençais par faire observer que, dans certains cas ou circonstances, son opinion pouvait être juste, mais que, dans le cas présent, *il me paraissait, il me semblait* qu'il y avait quelque différence, etc. J'éprouvai bientôt l'avantage de ce changement de ton. Les conversations où j'entrais en étaient plus agréables ; la manière modeste dans laquelle je proposais mes opinions leur procurait un plus facile accueil et moins de contradiction ; j'avais moins de mortification moi-même quand je me trouvais dans mon tort, et je venais plus à bout de faire revenir les autres de leurs erreurs.

From "Profils anglais," by SAINTE-BEUVE.

RESULT OF THE MARCH COMPETITION.

The prize is awarded to "Conor." (Will "Conor" kindly forward name and address for publication?)

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Second Class.—Karrotts, Acer, Harriet, Try Again, Greeba, Lily, Audiedaw, Revo, Hael, Napoléon III., Willy, Sarasvati, Query, Orcadia, Philosophe, Crontha, Margaret, Blackrock, Curio, Lucasta, Forward, Spencer, Peter, V. G., Bisley, Rosalind.

The name and address of "Acanthus," who gained the prize in last month's competition, are: Miss Gertrude A. Clark, St. Stephen's Rectory, Ipswich.

REPORT.

There is again a gratifyingly large number of competitors, and the merit of the papers sent in is high. Most mistakes were made in "*qu'elle savait . . . ces clercs.*" Some competitors took *que* as equivalent to the compound pronoun *what.* The whole of the passage indicated is the object of *confiait. Pouvait* in the above passage is equivalent to *pouvait faire.* Some took it as equal to *pouvait dire. Je ne sais ni A ni B* is equal to "I am entirely ignorant."

PRIZE TRANSLATION.

She was quite at ease when surrounded by the men-at-arms. It was the doctors she could not bear ; their presence, when they came to examine her, was a veritable torture. For although these theologians were very careful to spare her feelings, their everlasting questionings exhausted her patience, and their slowness and sluggishness exasperated her. She was extremely ill-disposed to them for not immediately believing in her without proofs, and for asking for a sign, which she could not give them, since neither St. Michael nor St. Catherine nor St. Margaret appeared during the examinations. In the privacy of her chambers, in the oratory, and when alone in the fields she was visited by all the hosts of Paradise ; angels and saints descended from the heavens and thronged around her. But with the advent of the doctors Jacob's ladder was suddenly withdrawn. Besides, they were theologians and she was a saint, and it is always difficult to maintain relations between the heads of the Church militant and the saintly women who have direct communication with the Church triumphant. Joan realised that the revelations which it pleased Heaven to shower upon her in such abundance were sources of doubt, of suspicion, and of distrust even to the most favourable of her examiners. She did not dare to tell them too many of the secrets of her Voice, and behind their backs she informed her noble Duke of Alençon in confidence that she knew and could do a good deal more than she had admitted to all those clerics. Not to them had she been sent ; not for them had she come. She felt embarrassed when in their company, and their deportment inspired her with the pevishness which is visible in more than one of her replies. Sometimes when they were examining her she would shrink back rebelliously to the end of the bench and sulk. "We are sent to you by order of the king," said one, Peter of Versailles by name. She rejoined ungraciously, "I can quite see that you are sent rather to cross-examine me. I know absolutely nothing." But when asked, "Then why have you come?" she replied passionately, "I come by order of the King of heaven to raise the siege of Orleans, and lead the king to Rheims for his consecration and coronation."

NOTICE.

The Editor greatly regrets the necessity for omitting Mr. Perkins's concluding article on the Van Boy, which he hopes to print next month, as well as Mr. Briggs's paper on Photography.

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I LIKE to think of the Japanese craftsman who, on being complimented upon the beauty of his handiwork, replied with a quiet smile of sincerity, "Ah, but the next will be more beautiful still." I thought of him one day when, seated in an Education Office in the North of England, I saw above a shelf of the bluest of Blue Books a framed print of Kogio's "Mouse on a Radish." It was like a gleam of sunshine in a metropolitan fog.

The print is one of the beautiful publications of Mr. Ken Hoshino, whose productions have already been

noticed in these columns, and who has just sent me a further selection of exquisite samples, which lie before me as I write. They have all the haunting suggestiveness and delicacy both of colouring and of line which characterise the best examples of Japanese art, and one is tempted to make some inquiry as to the methods of work which produce at a very low price such perfect products of artistic genius, taste, and craftsmanship.

The plates are printed from wood blocks, and each represents the product of the devoted labour of three persons—namely, the artist, the wood-carver, and the printer. The blocks are usually made of cherry-wood, but for those portions of the picture in which there are

very delicate lines the harder box-wood is employed. A separate block is required for each different colour, and, indeed, for each variation of shade, however slight. As a consequence, some of these examples now lying before me have received from fifty to a hundred separate impressions. The final prints represent, therefore, the accumulated result of infinite care and patience, and the whole credit of the production ought not to be given to the artist, who is responsible for the design and colouring. The wood-carver and the printer are the interpreters of the artist's conception, and each of these workers exercises a craft which appears to me to differ in only a very slight degree from artistic creation.

Among the samples submitted to me are a number of small panels sold at the astounding price of threepence each. One of these, representing a pigeon-cote-like lantern and autumn flowers, could not be readily surpassed by some of our finest colour prints issued at prices prohibitive to ordinary people. Another, representing a boy on a bullock, is full of native atmosphere; while a third, showing a frail holding a chrysanthemum, above which a butterfly is poised, exhibits all the seeming carelessness which is one of the chief charms of the Japanese artistic method.

A number of small landscapes are priced at sixpence each! One of the most beautiful shows a wintry scene, a leaden sky, a semicircular bridge, and a distant farmhouse. Another is a beautiful night scene on a broad bay dotted with illuminated house-boats, the occupants of which are watching a firework display. Several of these examples show the sacred mountain which represents to the native of Japan more than any Englishman can readily conceive. We have no Fuji-San.

For the decoration of the school or study wall I know of nothing more pleasing or educational in the highest sense than these Japanese prints. We understand that Mr. Ken Hoshino sends out selections on approval, and we should imagine that all those who avail themselves of this generous offer end in making a purchase which they never regret. We recommend the purchase, say, of a dozen of these prints, each of which ought to be suitably framed. One of the twelve should then be hung in a worthy position, and the rest carefully stored in a dry place. The first picture might hang for a month, and then be replaced by a second, which would occupy the place of honour for a second month, and so on until the whole twelve have been exhibited. This is the Japanese method, and to my mind there is much to recommend it.

EDUCATIONAL AIMS AND EFFORTS.

SIR PHILIP MAGNUS, M.P., was one of the pioneers of the technical instruction movement which made progress at the end of the last century, nurtured by the well-applied "whisky" money. Messrs. Longmans publish, under the above title, his history of educational progress from 1880–1910, which forms a valuable contribution to the history of education. His introductory chapters give heart to the most hopeless educational pessimist. These thirty years have seen gigantic strides, and we have hopes that Sir Philip and the rest of us will live to see still more done to realise his ambitions.

Much of this book is in the manner of an autobiography, and the latter portion sets out the excellent practical articles and address of which Sir Philip is the author. Naturally in every case handwork forms the central theme, and we can understand that the head of the City and Guilds of London Institute finds little room in his scheme of things for æsthetic training. This may be a bold assumption, for who shall say that handwork has no culture value? Educationists will find the book useful as a work of reference.

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EXTRACTS FROM PRESS NOTICES.

The Athenæum (October 22, 1910) refers to "This modest-looking but really encyclopædic manual of town-lore topics, historical and actual," and says: "Of the chapters dealing seriatim with all the communal businesses and belongings of a modern city, from scavenging to schools of art, it would be difficult to speak too highly. The analysis is exhaustive, the statement lucid and concise, and the personal tone of the whole curiously wise and right."

The Manchester Guardian (September 27, 1910) says:—"We hope that many teachers whose work lies among the children of the higher classes in our elementary schools will obtain and make use of 'Town Study,' by Miss M. M. Penstone. Apart from those pages which deal with the technique of teaching, the volume is an excellent introduction to the study of local and central government for the ordinary citizen."

South Wales Daily News (September 17, 1910) says:—"This is a remarkable book, in its novelty, its essential value, its completeness .....It is abundantly illustrated, both with pictures and diagrams, and contains a vast amount of information which commends it to the general reader."

Secondary Education (September 15, 1910) says:—"It is difficult in a few words to convey an adequate impression as to the value and usefulness of this contribution to teachers' manuals. We have read it with the utmost profit and pleasure, and we should be surprised to learn that anybody else could read it through without enjoying an experience similar to our own."

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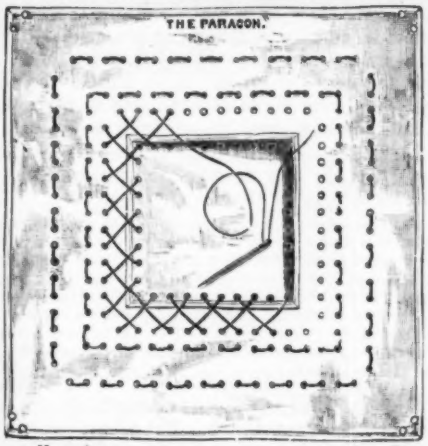

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A BOOK FOR THE HISTORY TEACHER.

MESSRS. METHUEN have just issued a volume entitled *The Customs of Old England*, by Mr. F. J. Snell, which provides material for a large number of history lessons of the most modern and interesting character. For example, we should ourselves delight in the opportunity of devising a lesson from p. 274 on "The Stray Cow," and using it to afford an interesting and entertaining peep into Saxon life in the early days. Some of our pupils, too, would delight in hearing about the Boy Bishop, whom Mr. Snell describes so well, and would learn more real history from the old print showing "How a King Travelled" than they would from a complete history "reader." In connection with the latter subject we have an entertaining peep of the "good old days:"—

> "The humbler people who escaped billeting might still have cause to regret royal journeys, owing to the inconsiderate exercise of the right of pre-emption. Subjects were compelled to sell; and the worst of it was that the king's purveyors were in the habit of paying, not in cash down, but by means of an exchequer tally or a beating. A tally was a hazel rod which had certain notches indicating the amount due. It obtained its name from the circumstance that these rods were in pairs, the creditor having one, and the debtor the other, so that they could be used for the purposes of comparison. In practice it was found no easy matter to recover under this system, which lent itself to the worst exactions, and is the subject of numerous complaints in our early popular poetry. Thus, in *King Edward and the Shepherd*,—
>
> 'I had catell, now have I none;
> They take my beasts and done them slon,
> And payen but a stick of tree . . .
> They take geese, capons, and hen,
> And all that ever they may with ren,
> And reaves us our catell . . .
> They took my hens and my geese
> And my sheep with all the fleece
> And led them forth away.'"

Mr. Snell's book is well illustrated, and ought to find a place in every teacher's bookshelf.

NATURAL NATURE STUDY.*

"AND the Lord God planted a garden." To be sure, we have wandered far from the natural mode of living; but if Mr. Feasey has his way, we shall be led soon to demand that gardens shall abound everywhere. Mr. Feasey's book, *In the Garden*, is interesting through and through. Attached to the school of which he speaks is a garden of more than ordinary limits, which permits him to give rein to his undoubted gift for gardening and Nature study. Herein he has set out "to describe this particular garden and its arrangement and conduct," and he has done it well.

It is a moot point whether gardening should be an appanage of Nature study, or Nature study of gardening. Mr. Feasey is in no manner of doubt. "It [the garden] should be laid out so as to meet the requirements of the syllabus of lessons on plant life." And again: "The great business of the garden is with Nature study." Or again: "There is a far more important use.....in bringing them [the children] into touch with their surroundings, giving them an intelligent knowledge of the soil and the plants which grow upon it."

If this book is any criterion, one is bound to admit that Mr. Feasey has accomplished his aim. This description of what is being done in one particular school reads naturally, and one can picture the children entering into the work with zest and enthusiasm. The co-operative system is admirable, and all work upon a common patch. In addition, each has his own plot, and "each boy finds his own seed, does his own work, takes his own produce, all in his own time."

Then in entertaining fashion our author shows us how the garden is utilised for Nature lessons. Interesting talks upon the soil, the weather, direction and slope, and similar topics, as well as upon various phases of plant life, are set out in detail, and excellently illustrated with photographs and sketches. This garden allows scope for tree culture, and to this is devoted a helpful chapter, which contains so much that is excellent that it is to be regretted that a suggestive list of British trees was not appended.

* *In the Garden.* By J. Eaton Feasey. Pitman. 2s.

TALKS ABOUT TREES.

"GOOD wine needs no bush." Mrs. A. L. Sandford is so deservedly popular an author of lessons for the kindergarten that her latest book under the above title (Sir Isaac Pitman) will be warmly welcomed. Over forty lessons are set out in full under the heads of Preparation, Presentation, and Association, followed by the inevitable Formulation and Application, in the shape of suggestions for correlation and expression by songs, games, stories, drawing, paper-cutting, modelling, and even blackboard writing copies. Accompanying each lesson are some useful sketches by Mr. Walter Wood, showing the tree *en masse*, typical twigs, leaves, sprays and flowers, as well as suggestive exercises for modelling and drawing. We share with Mrs. Sandford the wonder that our children remain so ignorant of our trees. She has done her part to remove the ignorance, and it remains for teachers of juniors—and seniors too, for that matter—to adopt some of her hints to their surroundings and opportunities.

A BIBLE STUDY WEEK FOR TEACHERS IN ELEMENTARY SCHOOLS (APRIL 15–22).

PROFESSOR SADLER asks me to give publicity to the following notice:—To meet a desire for further study on the part of many who are giving religious instruction in elementary schools, a course of lectures on the Bible will be delivered at Claydon, a beautiful Buckinghamshire village with many historical associations, from April 15–22 next. The mornings will be devoted to courses of lectures on "The Value of Old Testament Study" and "The Gospel according to St. John." Lectures will be given by the Master of Selwyn College, Cambridge; Dr. Foakes Jackson, Jesus College, Cambridge; the Rev. R. G. Parsons, Fellow of University College, Oxford; Professor Nairne, King's College, London; and Dr. Oesterley. The afternoons will be left free for expeditions to places of interest in the neighbourhood, and for sketching, botanising, and photography. In the evenings there will be single lectures, including one by Mrs. Salmon on "Florence Nightingale," whose life was closely connected with Claydon House. Cottage lodgings will be available for those attending the meeting. Tickets for the week, including board, lodging, and admission to all lectures, will vary in price from one pound to thirty shillings, according to accommodation, and will be allotted to the first fifty teachers who apply. Those making their own arrangements for lodgings will pay six shillings for a ticket admitting to all lectures, or one shilling a day. There will be a loan library for the use of teachers before the meeting and during the week of Bible study. The three Claydon public libraries will afford facilities for quiet reading and writing. Applications for tickets should be made to Miss Beatrice Leahy, Claydon House, Steeple Claydon, S.O., Bucks, who, with Miss Ruth Verney, is acting as honorary secretary to the organising committee.

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